THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XX. No. 485—23RD YEAR.] LONDON, MAY 9, 1871. [Subscription { 15s. in Advance. / 18s. Credit.] DOUBLE No. Price 1s.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal: 26-candle gas; 13¼ cwt. coke per ton of coal.

RAMSAY'S PATENT CONDENSED COKE.

DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.

GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES. CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.

Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.

Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GEORGE GLOVER & CO.,

Patentees of the Standard Gasometers for the Government, and of the

IMPROVED DRY GAS-METERS.

These Meters are warranted to measure correctly and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured.

To meet the increasing demand, G. GLOVER AND CO. have just entered on possession of extensive premises adjoining their present Works in Ranelagh Road, and they are now prepared to execute promptly, orders to any extent. They keep in stock all sizes of Meters up to 200 lights. In cases of haste, on the receipt of a telegram early on one day, their Meters can be delivered next day in any part of England, and in the large towns in Scotland.

Particulars and lists of prices forwarded on application to—

RANELAGH ROAD, PIMLICO, LONDON, S.W.;

236, GEORGE STREET, GLASGOW;

OR

15, MARKET STREET, MANCHESTER.

COWEN'S PATENT FIRE-CLAY RETORTS.

JOSEPH COWEN and CO.,

BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and OTHER OBJECTS in FIRE-CLAY," and they have also been awarded in the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.

COWEN'S GARESFIELD COALS.

Coal Office,

QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.

JOHN RUSSELL and CO.,

THE OLD TUBE-WORKS,

CHURCH HILL, WEDNESBURY;

ALMA WORKS,

WALSALL, STAFFORDSHIRE;

and 69, UPPER THAMES STREET, LONDON,

Original Manufacturers of Wrought-Iron Gas-Tubes, and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam-Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest orders may be executed in a few days.

Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanized Tubes, &c.

N.B.—All goods thoroughly tested before sent out, and warranted.

JOHN BENT & SON,

WET AND DRY GAS-METER AND STREET-LAMP MANUFACTURERS,

BELL BARN ROAD, BIRMINGHAM.

ESTABLISHED 1830.

All materials found for the alteration of Public Lamps for lighting with the Rod. Regulators with Lava Burners.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS, NEAR NEWCASTLE-ON-TYNE.

WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

London Agents: JAMES LAWRIE & CO., 63, OLD BROAD STREET, CITY, LONDON.

CANNEL COAL FACTORS.

J. & W. ROMANS, of Edinburgh and London, in returning thanks for the confidence hitherto reposed in them, beg to intimate that they have extended their Colliery connexion for the supply of SCOTTISH CANNELS, and have taken a lease of the CROWN WHARF, LIMEHOUSE CUT, LONDON, where these rich Coals can be obtained at the lowest prices.

Messrs. ROMANS, being lessees of several Gas-Works in Scotland, have their Cannels tested in the ordinary working-process-way of gas-making, thus securing for their customers additional guarantee, beyond mere laboratory experiments.

Contracts made to supply any quantity, and analysis sent, on application to the Offices, 53, Frederick Street, EDINBURGH, or 1, Walbrook, Mansion House, LONDON.

Shippers of steam and house Coal, entered on the Government list. Freightage secured on best terms.

LESMAHAGO GAS COAL,

AUCHINHEATH COLLIERY,

LESMAHAGO N.B.

JAMES FERGUSON & CO.

LESSEES SINCE 1832.

LONDON AGENTS:

JAMES LAWRIE & CO.,

63, OLD BROAD STREET, E.C.

CONTINENTAL AGENTS:

LA COUR & WATSON,

LEITH.

CROLL'S DRY GAS-METER,

PRIZE MEDALS. LONDON, 1851; NEW YORK, 1853; PARIS, 1855.

(INVENTED & PATENTED IN 1844,)

COMBINING ALL THE LATEST IMPROVEMENTS,

MANUFACTURED ONLY BY

PRIZE MEDALS. LONDON, 1862; DUBLIN, 1865; PARIS, 1867.

THE GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON, N.E.

MEDAL AWARDED, EXHIBITION, 1862, "FOR GOOD WORK."

THE IMPERIAL TUBE COMPANY, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES & FITTINGS, BRASS & COPPER TUBES,

GALVANIZED & GLASS ENAMELLED TUBES & FITTINGS,

LAP-WELDED IRON & BRASS BOILER-TUBES, ETC., ETC.

Twyere Coils for Blast Furnaces, Boring Tubes, Core Bars, Gun-Metal and other Cocks, Boiler Mountings, &c.

HUGHES'S PATENT TAPS FOR HIGH PRESSURES.

HENRY HOWARD & CO.,

COOMBS WOOD PATENT TUBE-WORKS,

OLD HILL, near DUDLEY,

MANUFACTURERS OF

HOWARD'S PATENT IMPROVED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

CORE BARS FOR IRONFOUNDERS, STOCKS, TAPS, AND DIES, IRON COCKS, &c.

London Agent—W. G. DAVIS, 2, Brabant Court, Philpot Lane, E.C.

SILVER MEDAL, PARIS EXHIBITION, 1867.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS

For Gas, Steam, Water, &c.

SOLE LICENSEES for the United Kingdom for the LAVENANT PATENT ENAMELLED TUBES & FITTINGS,

the Coating of which does not shell off, is a certain preservative from rust, and resists all effects of expansion and contraction.

LAP-WELDED IRON & HOMOGENEOUS METAL TUBES

For Locomotive, Marine, and Stationary Boilers.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools of all kinds.

London Offices: No. 4, Cloak Lane, Queen Street, E.C.

WAREHOUSES:

LONDON: No. 157, Upper Thames Street, E.C. LIVERPOOL: No. 63, Paradise Street. MANCHESTER: Barlow's Croft, Chapel Street, Salford. PARIS and LILLE.

ECONOMY IN GAS PURIFICATION. A PURER GAS AT LESS COST, AND GREAT SAVING IN LABOUR.

M'DOUGALLS' PRECIPITATED PEROXIDE OF IRON.

The above Oxide is now in use at some of the largest works in the kingdom, and has gained a decided preference, owing to its efficiency, cheapness, and the great saving in labour effected by its use.

It is a pure artificial Hydrated Peroxide, with an addition of only sufficient sawdust to give it the needful lightness or porosity to prevent pressure, and every particle is available for use.

In selecting an oxide, a point more important than its price, is to learn the cost of labour entailed in its use. Whilst at large works the cost of labour for purifying, where lime alone or the natural oxides are employed, is 2d. to 3d. per ton of coals, by the use of the above Oxide it is reduced to 1d. to 1½d., owing to the purifier's working so much longer when charged, and to rapid revivification—two points of special importance in the busy season.

For export to Foreign Works it is unequalled, every particle being available, and saves freight over less concentrated materials.

NOTE.—It is important to note that only the Hydrated Peroxide of Iron is useful, simple oxide being worthless. Inferior oxides show a large per centage of simple oxide, but very little Hydrated Peroxide.

M'DOUGALL BROTHERS,

LONDON—158, LEADENHALL STREET, E.C. MANCHESTER—68, PORT STREET.

E. J. & J. PEARSON,

DELPH & TINTAM ABBEY FIRE-CLAY & BRICK WORKS,

STOURBRIDGE,

PROPRIETORS OF

BEST GLASS-HOUSE POT & CRUCIBLE CLAY;

MANUFACTURERS OF

GLASS-HOUSE POTS, CRUCIBLES, GAS-RETORTS, & FIRE-BRICKS OF EVERY DESCRIPTION.

TRADE MARK.

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

CROWN TUBE-WORKS,

WEDNESBURY, STAFFORDSHIRE.

WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM,

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

CAST AND WROUGHT IRON GIRDERS, BRIDGES, AND ROOFS,

STEAM-ENGINE BOILERS, & GENERAL WROUGHT-IRON WORK.

London Agents: PORTER and LANE, 172, FENCHURCH STREET, E.C.

D. BRUCE PEEBLES & CO.,

ENGINEERS, WET AND DRY GAS-METER MANUFACTURERS,

BRASSFOUNDERS, & GAS APPARATUS MANUFACTURERS,

FOUNTAINBRIDGE WORKS, EDINBURGH.

SOLE MANUFACTURERS OF

Peebles' Patent Wet and Dry Gas-Meters in Tin-Plate Cases, with Tongue and Groove Joints.

IMPROVED WET METERS IN CAST-IRON CASES.

STATION-METERS, GOVERNORS, EXPERIMENTING METERS, PHOTOMETERS, PRESSURE-GAUGES, &c.

C. & W. WALKER'S GAS-VALVES.

These celebrated Valves of all kinds have been in use for so many years, and are so well known, that a description is unnecessary They are made of all kinds to suit all the requirements of engineers.

Midland Iron-Works, Donnington, near Newport, Shropshire; 8, Finsbury Circus, London.

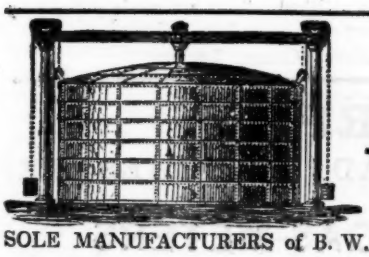
TO GAS COMPANIES, ENGINEERS, AND MACHINISTS.

NEW LUBRICATING OIL.

This Oil is suitable for every kind of machinery, being entirely free from anything liable to produce corrosion, and is equal in lubricating power to sperm or lard oil (though supplied at half the cost).

It is prepared in two consistencies—viz., LIGHT MACHINE OIL, for machinery where the pressure is moderate and the motion rapid. HEAVY MACHINE OIL, on machinery where the motion is comparatively slow. *Four-gallon Samples, carriage free, can included, for* £1 1*s.*

WALTER CARSON & SONS, Belle Sauvage Yard, Ludgate Hill, London, E.C.; 21, BACHELORS WALK, DUBLIN.



IMPROVED GAS APPARATUS,

FOR CITIES, TOWNS, VILLAGES, &c.,

INVENTED AND MANUFACTURED BY

W. C. HOLMES & CO.,

WHITESTONE IRON-WORKS, HUDDERSFIELD.

SOLE MANUFACTURERS of B. W. THURSTON'S IMPROVED SCRUBBER, CONDENSER, and WASHER, in use in many of the principal Gas-Works on the Continent.

PATENTEES of the IMPROVED COMBINED PURIFYING APPARATUS, so eminently adapted for Exportation.

ESTIMATES, PLANS, and SPECIFICATIONS PREPARED for BUILDINGS and APPARATUS.

Prospectus, Price Lists, &c., on application.

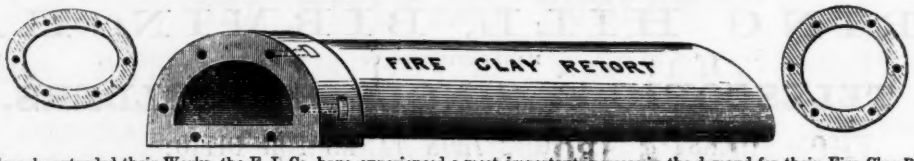
LONDON OFFICES—57, GRACECHURCH STREET, CITY.

*** *Please address letters to Huddersfield.*

REFERENCES TO NEARLY 300 GAS-WORKS.

THE FARNLEY IRON COMPANY, LIMITED,

FARNLEY, near LEEDS.



Since they so largely extended their Works, the F. I. Co. have experienced a most important increase in the demand for their Fire-Clay Retorts, which they owe chiefly to the superior quality of their make, and to the facilities they now possess for executing orders promptly, either for *home* or for *export*.

The Fire-Clay raised from the Farnley Estate (commonly called the Wortley bed) is unsurpassed by any other known in the district, and is peculiarly well adapted for Retorts, Gas-Ovens, and Fire-Bricks; and the F. I. Co. beg especially to invite those connected with Gas-Works, who have not yet used their Retorts, to be good enough to favour them with a trial.

The F. I. Co. generally hold in stock, for immediate supply, FIRE-BRICKS of every size and kind, White Facing Bricks, the White, Buff, and other GLAZED Bricks, in various colours and shapes, now extensively used for *Engine-houses*, Business Premises, as well as for Domestic and Public Buildings.

Prices, Drawings, and all other information may be obtained by applying *as above*; to the

Offices, 3, Westminster Chambers, Victoria Street, S.W.; or to F. Sutton, 46½, Queen Street, Hull.

N.B.—The Farnley Iron Company, Limited, give notice that they have the exclusive right of manufacture and sale of

"FRASER'S PATENT RIBBED" FIRE-CLAY RETORTS,

BY SPECIAL AGREEMENT WITH THE PATENTEE.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.

KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

Agent in Ireland—Mr. JAMES FURNESS, No. 3, FOWNES STREET, DUBLIN.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

A large Stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all Sizes kept in London at Mr. ALFRED WILLIAMS, Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

C. & W. WALKER'S

WOOD SIEVES FOR PURIFIERS

Have now been in use for more than ten years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

Midland Iron-Works, Donnington, near Newport, Shropshire; 8, Finsbury Circus, London.

FLETCHER AND MURPHY,

GARRATT STREET WORKS, OLDHAM ROAD, MANCHESTER;

Manufacturers of

IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

AND

IMPROVED DRY GAS-METERS;

STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS,

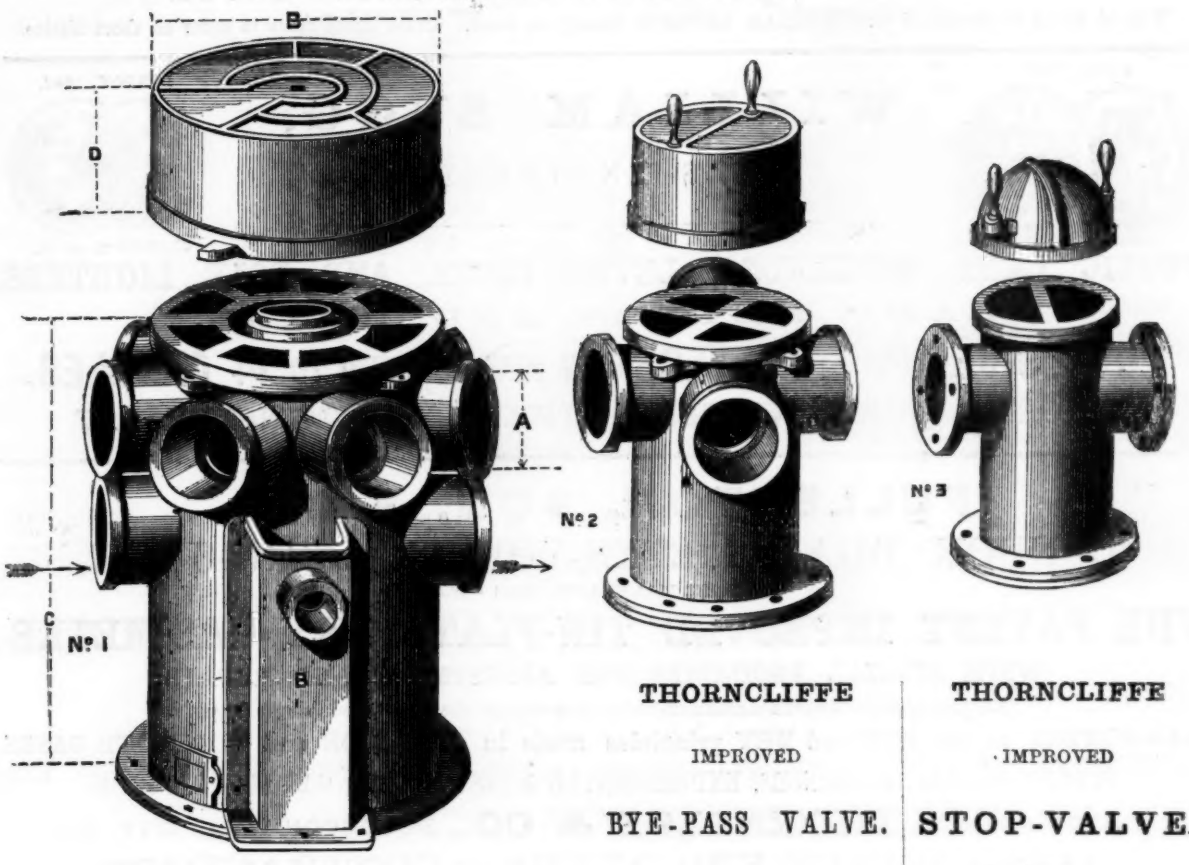
And all kinds of Experimental Gas Apparatus.

THE THORNCLIFFE IMPROVED CENTRE-VALVE,

MANUFACTURED BY

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.



THORNCLIFFE

IMPROVED

BYE-PASS VALVE.

SIZES

From 3 ins. upwards.

THORNCLIFFE

IMPROVED

STOP-VALVE.

SIZES

From 3 ins. upwards.

Sizes of the

THORNCLIFFE IMPROVED CENTRE-VALVE.

		Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A	Bore of Pipe...	4	5	6	7	8	9	10	12
B	Diam. of Body.	16	20	23	26	28	31	34	40
C	Height of Tank.	33	35	38	43	46	48	51	56
D	Depth of Cover.	8	9	10	11	12	13	14	16
	Total height...	41	44	48	54	58	61	65	72

In all cases the Covers are cast heavy enough to resist any required pressure.

The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

These Valves may be made of any size to suit any position of boxes, to stand any amount of pressure, warranted and tested with gas before leaving the manufactory, prepared to work any number of boxes in rotation—say, two, three, four, five, six, or eight—and for all Valves above 12-inch ports a suitable rack-and-pinion movement is attached if preferred. These Valves (specially arranged) are applicable to inlet or outlet pipes of gasholder, to act as Bye-pass Valves to meters, governors, exhauster, condensers, scrubbers, washers, driers, and duplicate systems of hydraulic main; also to act as Stop-Valves on special mains about the works. Where it is important no impediment be offered to tar or ammoniacal liquor, the same having uninterrupted flow to the general tar-well on the works, and for which purpose the slowly changed, often disordered, and at all times obstructive Slide-Valve (challenging the best of them) is superseded by the exceedingly simple, instantaneously changed Dome-Top Valve, which also carries so marked an index, whether open or shut, at any distance from close observation, providing the Valve can be seen at all. See sketch in perspective, No. 3.

London Office—34, LONDON WALL, MOORGATE STREET, E.C.

JOHN HALL & CO.,

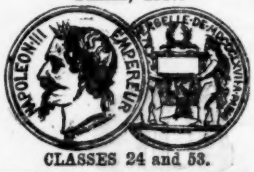
STOURBRIDGE,

MANUFACTURERS of FIRE-BRICKS, LUMPS, & TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

PARIS, 1867.



CLASSES 24 and 53.

WILLIAM SUGG,

GAS ENGINEER.

LONDON, 1862.

CLASSES 13 and 31.

PUBLIC LAMP GOVERNORS, LEVER COCKS, AND POLE LIGHTERS,

LAMP METERS AND BOXES.

LOWE'S JET PHOTOMETERS CAN NOW BE RATED TO 14 CANDLES.

VINCENT WORKS, VINCENT STREET, WESTMINSTER, S.W.

FULLERTON, SON, & CO.,

LONDON ROAD METER-WORKS, EDINBURGH,

SOLE MANUFACTURERS OF

THE PATENT IMPROVED TIN-PLATE DRY GAS-METER,

WITH SPECIAL FACILITIES FOR ADJUSTMENT AND REPAIR,

The principal parts of the mechanism being accessible by the removal of a single Screw.

GAS-METERS on the WET and DRY principles made in CAST-IRON and TIN-PLATE CASES.

STATION-METERS, GOVERNORS, EXPERIMENTAL & TEST METERS, GAS APPARATUS, &c.

LONDON AGENTS: THORNELOE & CO., 34, LONDON WALL, CITY, E.C.,

GAS & WATER ENGINEERS, & CONTRACTORS

FOR GAS & WATER WORKS APPARATUS.

SHOW-ROOMS AND WHOLESALE WAREHOUSE FOR

Wrought-Iron Tubes and Fittings for Gas, Water, and Steam; Chandeliers, Pendants, Lamps and Brackets; Plumbers Work, Water-Closets, Pumps, &c.; Lead, Composition, Brass, and Copper Tubes.

METERS SUPPLIED TO ORDER FROM STOCK.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS AND COLLIERIES,

NEAR SHEFFIELD.

CELEBRATED SILKSTONE GAS COALS.

Analyses by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

Description.	Cubic Feet of Gas per Ton of Coals.	Illuminating Power in Candles.	Coke per Ton of Coal used. Cwt.	Ash in Coke per Cent.	Sulphur in Coa per Cent.
Best Silkstone . .	10,900	17·0	12·8	2·6	1·7
Norfolk Silkstone . .	11,000	15·94	12·5	4·4	1·64
Silkstone Brights . .	11,500	14·5	12·6	7·4	1·85
Silkstone Nuts . .	10,800	15·85	12·66	6·0	0·69

NOTE.—The illuminating power of the Gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

OFFICES, 34. LONDON WALL, CITY, E.C.

TANGYE BROTHERS & HOLMAN,

10, LAURENCE POUNTNEY LANE, LONDON, E.C.;

And BIRMINGHAM (TANGYE BROS.), CORNWALL WORKS, SOHO.

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS.

Over 1000 of the Patent Retort-Lids and fastenings already supplied to the great works of The Gas Company at Beckton.

Several hundreds in use at the works of the London Gas Company.

FIG. 1.

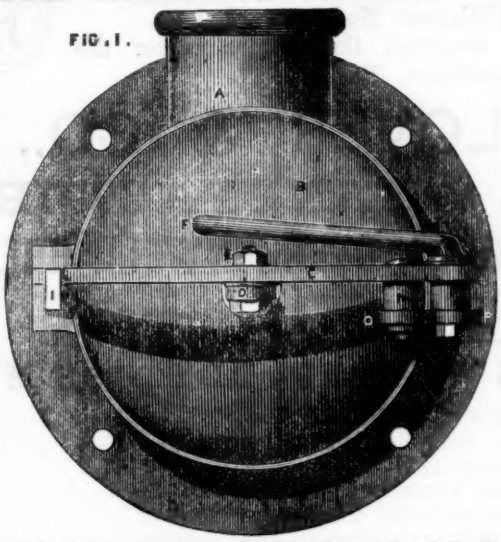
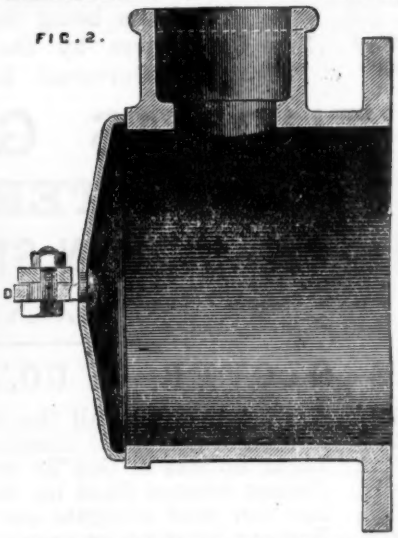


FIG. 2.



Adopted in the Gas-Works at

LIVERPOOL,
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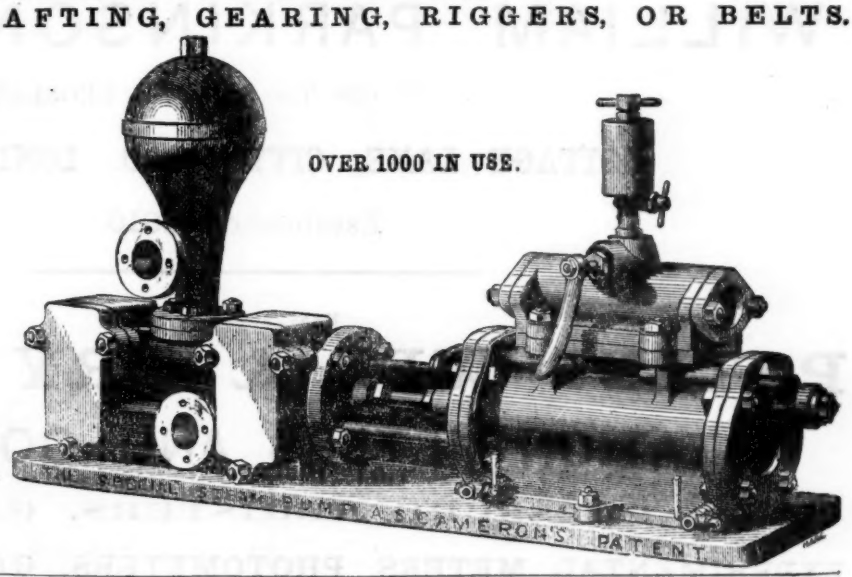

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TUESDAY, MAY 9, 1871.

Notes upon Passing Events.

THE International Exhibition has been opened with all the pomp and patronage that Court influence could secure—royal personages to head a procession, the royal body-guard to clear the way, a crowd of officials in costumes, the Lord Mayor, the City companies with their banners, and a large collection of country mayors in new robes and gold or gilt chains purchased or hired for the occasion; a special amount of original music in colonel Scott's re-echoing hall, open to all who would pay for a season ticket. Yet, in spite of the assistance of a loyal press, it must be admitted that, as a ceremony or as an excitement, the whole business was a failure—a procession that few people could see, and a concert that few cared to hear. The fact is that any attempt at making up an imposing ceremony of the opening of a kind of exhibition which has been thoroughly worked out, must be a failure. One might as well get the Lord Mayor to attend the first performance of a pantomine at Drury Lane, and expect an enthusiastic sensation. It is galvanizing a corpse. No old man can feel like a young one. The boy's first visit to the play, the girl's first ball, the first fox-hunt to a born sportsman, the wedding of a young lover to the girl of his heart, are events that cannot be repeated or revived with any amount of paraphernalia. The opening of the Exhibition of 1851 was the crowning ceremony of an undertaking that interested the whole British empire, and in which almost all Europe had part. It was not mere business, or art, or science. The results were to a certain extent rude, chaotic, and even absurd; but there was a sentiment, a glorious enthusiasm that can never be revived, and each attempt to repeat the outward show will end in a more and more ridiculous failure. We might just as wisely get up an annual ceremony to celebrate the re-opening of the British Museum or the National Gallery after an interval for cleaning and whitewashing. But although May-day, 1871, showed a rehearsal of "Much ado about Nothing," it may fairly be admitted that the Exhibition itself is pretty, nicely arranged, and fairly interesting as an educational museum for the uneducated and half-educated classes. It is a pleasant addition to the Horticultural Gardens, and a *raison d'être* for the Albert Hall. The new temporary buildings completing the square on the four sides of the garden, perfectly justify those who insisted on pulling down the massive halls of 1862—halls which would have been so difficult to fill, and so costly to keep in repair. The present galleries are on a scale which makes it not too difficult to form a good collection to each department, and to enable the objects, when once arranged, to be properly seen. Why there should be one more exhibition of the pictures of British artists, except on the true showman's principle, it would be difficult to say; but the opening to the display of the works of foriegn artists is a useful as well as an attractive feature. Comparison on equal terms must do our painters good. Altogether, in spite of the ridiculous fuss, the South Kensington International Exhibition will be a cheap shilling's worth for sight-seers. You may walk through the gallery or galleries that interest you, turn into the garden when tired, take a light refreshment or a serious dinner with Spiers and Pond, and return again, to study, or gossip, or listen to a band in the hall of everything, with Hyde Park on one side, and the Underground Railway station to carry you away on the other. The management on the opening day did not, however, reflect much credit on Colonel Scott's subordinates; while fussing about the Albert Hall's acoustic properties, what are genteelly called sanitary arrangements were quite forgotten. Ten thousand visitors, and no retiring-rooms for ladies or gentlemen! A cynic he might have been. A Saturday Reviewer remarked that the South Kensington authorities had forgotten their alphabet; the C.B.'s had omitted the W. C.'s.

From the speeches at the opening dinner of the Royal Academy, we learn that even this institution, once so truly exclusive and conservative, is open to the pressure of public opinion. The Exhibition of Ancient Masters, the extension of the schools, were great concessions, but insignificant in comparison with the appointment of a professor of chemistry!—chemistry is the science which, in the opinion of the late Robert Stephenson, had the greatest future. Whether the professor teaches modern artists how to paint in durable colours or not, his teaching must do good to one of the most ignorant amongst the educated classes. The liberal tone of the Royal Academy is, no doubt, due to the president. He cannot be called a great painter, in any sense of the word, but he is a man of the world—a man connected with governing classes, with none of the exclusive prejudices of country squires or of Manchester manufacturers. The exhibition of rejected paintings last year was a wonderful piece of evidence that the Academy rejected nothing worth having.

The tramway problem has certainly been solved both sides of the water. The tramways of that lunatic adventurer Train were a snare and a pitfall to every private carriage. You were sure of a jolt, and in danger of having a wheel wrenched off any light carriage. Under the present form of construction, the tramways offer no more obstruction than any piece of paving meeting a line of macadam. After this experience, we may safely predicate that nothing but a too steep gradient will stop tramways. The days of metropolitan railway extensions are almost

numbered. The Bill for the junction of Euston Square with Charing Cross is to pass; in the interest of metropolitan improvements, it is earnestly to be hoped that it will be completed. A new street through Seven Dials, and a rearrangement of Leicester Square gardens, are no small boons; but the cheap tramway opposition raises an obstacle that will require all the financial interest of that very slow, stupid, and highly respectable body, the management of the London and North-Western Railway Company, to overcome. What is to prevent a tramway from Paddington and the City running through the new opening to the eastern station, except the opposition of Mr. Cawkwell and his directors?

The threatening of a dry season has incubated a scheme, under the auspices of Mr. Fulton, for storing up waters in the valley of the Wye in winter, and letting them out for irrigation in summer. The authority of the late Mr. Pusey is quoted in favour of this scheme. Nothing can be more certain than that the modern system of deep drainage will render it necessary to store in wet seasons the superfluous waters which were formerly retained in the sponge-like earth, to be given out by degrees during the rest of the year. But it should be understood that the profits of irrigated land, except sewage irrigation, are by no means certain. It is not all water that produces fertility. Hard water is positively injurious. Arthur Young and Francis Duke of Bedford preceded Mr. Philip Pusey in preventing the extension of water meadows. But they have not increased in the last half of this century, and many, created at great expense, have been discontinued because they did not pay. All this will be found recorded in the transactions of the Royal Agricultural Society.

The late Prince Consort once excited a good deal of unnecessary indignation amongst the half-educated classes by saying, during the Crimean War, that "the constitutional system was on "its trial." He was afraid that the people of England would talk and find fault, instead of allowing our chiefs to act. As it turned out, our constitutional system of printing and publishing everything detected the causes of our military mismanagement, which the despotic system would have concealed, and not cured. There is a class largely represented by militia colonels who will tell you that parsimony has been the great obstacle to the efficiency of the British army. They honestly believe what they say, but nevertheless talk nonsense. Let us illustrate this statement by some extracts from unpublished pages of contemporary history—the history of the Horse Guards, where newspapers and newspaper writers are so cordially and justly detested. We have, in previous "Notes," mentioned that soon after the Crimean War a zealous and studious subaltern brought from the United States a specimen of a breech-loading rifle that withstood the tests of water and weather, and was snubbed for his pains with the information that the Enfield rifle could not be surpassed. The story of the shell which General Boxer copied, patented, and called the Boxer shell is still more suggestive of the gross impropriety of interfering with Horse Guards traditions. A Crimean officer (we suppress his name until it appears in parliamentary papers), who had distinguished himself in charge of artillery, although not an artillery officer, by the damage he had done the enemy, discovered the defects of the shrapnel shell—its failure when exploding in a particular direction. On his return to England, at the peace, he studied the question, invented and manufactured a shell of full size—what is now known as the Boxer shell. Having obtained an introduction, he presented his invention to the attention of the amiable old general who was then at the head of the manufacturing department of British artillery. The general first informed him that "the English shrapnel shell "was perfect." On receiving an explanation of the defects that had been noted on actual service—defects which sometimes caused the shell to fail in inflicting damage on the enemy, and sometimes damaged the parties from whose side it was fired—the general then said: "But this shell must be fired from a rifled gun. "Young gentleman, a rifled gun will never be used in the British "army." This was in 1856, and the inventive subaltern believed the courteous old gentleman in whose care was then trusted the future of British artillery; but some lingering hope induced him to show the shell to Colonel Boxer, who pooh-poohed it. Finally the inventor deposited this shell, duly marked with his name, in the Woolwich Museum. This is the shell which General Boxer patented. And it is in such arrangements that Colonel North, of the Tower Hamlets Militia, objects to the intrusion of profane civilian hands.

If an answer were needed for such admirers of strong rulers as the Carlyleites and Arnoldites, we should find it in the fate of the Budget, devised by very clever men, defeated not by a parliamentary majority, but by public opinion. Now, public opinion is just what Mr. Matthew Arnold and the Carlyleites despise. The manner in which a strong Government has had to yield up its plans is the best possible tribute to the value of an elective and responsible Government. A matured reform that has gone through the ordeal of discussion and selection never suffers damage from reaction!

The Licensing Bill, under the storm of opposition raised by the parties who have an interest—they say a vested interest—in encouraging excessive drinking, will nevertheless have had one good effect. It has diminished the value of every public-house in the kingdom. By this or some other Government in the next or in an early session, the overwhelming temptations to excessive drinking will be assaulted, carried, and cut down to reasonable proportions. In the meantime, the dead walls are placarded with appeals to the sottishness and the ignorance of the working classes. To limit the hours for drinking beer and gin between seven o'clock in the morning and ten o'clock at night is called "an infringement of the liberty of the subject;" to put a check on the dishonest and poisonous adulteration of liquors, and to restrain disorderly conduct, is "to encourage spies and informers;" to turn to useful account the miscalled charities of money doles is "to confiscate the property of the poor;" and the publicans are wise in their generation—the recipients of indiscriminate charity are as much their good customers as the earliest and latest drinkers. Mr. Wethered, a brewer and Member of Parliament, has favoured the *Times* with the licensed victualler notion of reform. He asks for a compensation for licences extinguished "according to the usual manner of compulsory sale." The prospect of a jury under publican influence would effectually stop any Chancellor of the Exchequer. "Justices to be "empowered to buy up licences with the consent of three-fifths "of the inhabitants; security of tenure of licences to be attached "to the houses; a fund to be raised rapidly by a tax on licences "for buying up houses to be closed in the district; the penal "clauses of the Bill relating to the hours of closing to be excised; "and additional supervision (if necessary?) to be paid for out of "local or public funds; a new court of appeal to be provided." In a word, Mr. Wethered suggests a Bill for taxing the public in order to increase the value of the property of his customers and himself. Mr. Robertson Gladstone's suggestion, to begin by limiting the hours of opening and closing public-houses, if carried out and strictly applied to drinking-bars, would, in a few years, make the question of compensation easy. If public-houses were not allowed to open until eight o'clock, coffee-houses would spring up alongside them.

The old proverb of "tell me your friends, and I'll tell you what "you are," has been illustrated curiously by the sudden friendship struck up between such aldermen as the two brothers Lawrence, both Radicals to the backbone in Ireland, or anywhere except where City privileges and patronage are concerned, and such consistent disciples of the old school of politics as Lord John Manners and the Rev. Lord Buckhurst. The two aldermen Lawrence voted for the disestablishment of the Irish Church, and consented to the Endowed Schools Bill, the principle of which is the same as that on which the Charity Commissioners propose, without the application of torpid or corrupt trustees, to remodel useless and mischievous charities. But their schemes cannot be carried into effect without the consent of the Minister of Education for the time being, and of Parliament. The Liberal aldermen saw no objection to the Public Schools Bill as long as it only referred to such schools as Eton, Harrow, Rugby, Shrewsbury, and Westminster. The governing bodies of all these schools have been entirely changed under the Public Schools Act. But the aldermen of the City of London, like the French Republicans, consider the City a sacred ark on which profane hands ought never to be laid on any pretext or provocation. We need not turn to the Charity Commissioners reports; the City annals, in the official organ—the *City Press*—constantly present the grossest waste of money, under the name of charity, in bread doles, money doles, clothes doles, and pensions bestowed for anything but merit. These charities are jealously cherished and defended, because they are sources of agreeable patronage to a number of people who would be otherwise obscure. The effect of these miscellaneous charities, administered by irresponsible patrons—aldermen, common councilmen, churchwardens, incumbents of City churches—are perfectly summed up in the report of the Schools Inquiry Commission on Emanuel Hospital, the Grey-Coat Hospital, and the Green-Coat Hospital: "They do some harm and a little "good; they might do much good" and no harm. The aldermen are too late. They should have joined their forces to Lord John Manners's party thirty years ago, and then they would have had, if not more success, more sympathy.

The civil engineers, like all other prosperous scientific societies, keep up the healthy custom of dining together once a year. Like all other middle-class Englishmen, they endeavour to gild their social union by the presence of personages distinguished by rank, by official position, and by scientific reputation; and, unlike a great many societies, they do not allow "the shop" to be extinguished by the foreign and brilliant talk of their guests. Politics do not obtrude at all. The army, navy, and volunteers

keep their proper places, and the speeches have all a strictly engineering tone. This is as it should be; it adds to, instead of detracting from, the interest of the toasts and speeches. We remember the astonishment of a distinguished and scientific foreigner at an agricultural dinner, when speech after speech followed from noble and gentle guests, each commencing with a disclaimer of any knowledge of agriculture, and each speaker seeming decidedly proud of his ignorance. The Civil Engineers dinner included amongst its guests not less than seven of Her Majesty's Ministers, amongst them the First Commissioner of Works, the First Lord of the Admiralty, the Postmaster-General, and the Chancellor of the Exchequer, who made in his happiest manner the speech of the evening. The Royal Society was represented by Sir William Ferguson for medicine, and Mr. James Ferguson for architecture; while Professor Huxley represented all the sciences as President of the British Association. America sent Commodore Rogers. For France appeared "the great industrial exile, "if not emigrant, M. Schneider, of Creuzot." Major-General Tremenheere, an engineer officer, who returned thanks for the army, could not resist protesting against the contemplated changes in the service, with the constitution of which he expressed himself perfectly satisfied; so it seems he has not changed his mind like the Field Marshal Commanding-in-Chief. Sir John Burgoyne he called with fine irony the Moltke of the British army. But Moltke is, and has been, supreme in Prussian armies; whereas, according to history, Sir John Burgoyne was not allowed to seize and fortify the Malakoff Hill, although at an earlier date he was rewarded by being made an inspector of railways, of which he knew nothing. Mr. Goschen was happy in his description of the ship wanted for the future—"Swift as a bird, as impenetrable as a creature with "the thickest possible hide, perfect buoyancy, and extraordinary "strength," qualities never found combined in any one creature in creation. He concluded by asking for "a self-acting taxing-"machine that would carry out all these improvements, and "electrify the British taxpayer into voting the necessary cost with-"out explosion." The president made a hit in comparing the House of Lords to the "fly-wheel of a steam-engine." Mr. Lowe, in proposing the toast of "The Institution of Civil Engineers," took the opportunity of again depreciating that too exclusive attention paid to elegant and practically useless education in our public schools, and of recommending for those who, while still in their teens, have to enter on the serious business of life, the study of natural philosophy and the exact sciences. The Chancellor of the Exchequer said:

When I consider the ordinary education of this country, and compare it with that which has been for many ages, and will, I doubt not, be for more, the appropriate education of the civil engineer, I am astonished at the striking contrast between the two. My own education, and that of persons who have had the happiness of being brought up in the public schools and universities of the country, has consisted in a great measure in learning the theories and languages of people who knew little or nothing of nature, very little of the world in which they lived, very little, in fact, except the squabbles and quarrels they had one with another, and which they carried on on a scale of the most minute nature. When I think of the celebrated battle of Marathon, which was the object of my schoolboy enthusiasm, where 192 persons perished on the side of the victorious army, and when I compare that with the drama that has been enacted in another part of Europe during the last six or seven months, I cannot help thinking to how small a matter our schoolboy energies were directed. Why, gentlemen, a good colliery accident under your auspices would throw that into the shade. Well, gentlemen, I turn from these pursuits, beautiful and attractive as they are, but narrow and small and unfit to form a man to take part in the great drama of the universe, to the education that ought to be required, and will be required in future days, on the part of the civil engineer. What is that? In order to ascertain that, I look to the objects for which this institution was incorporated. Your business and object is to direct the sources of power in nature to the convenience and advantage of mankind. Now, gentlemen, that involves a double consideration—a speculative and a practical one. Any man who is to be fit for carrying out in its highest sense your noble profession ought to make himself master of those occult influences which surround us, and of which the ancients, to whose history we have devoted so much of our time, knew absolutely nothing. It is you and your predecessors in invention and discovery who have demonstrated in nature forces that were never dreamed of till within the last 200 years—the power of attraction, the power of electricity, which has given to us weak, short-sighted mortals the ability to accomplish instantaneous action over the whole course of the globe. It is your duty and happiness to subjugate these great influences for the convenience and good of mankind; to subdue, to moderate, and regulate them so as to render them faithful and obedient servants, and yet capable of accomplishing deeds which no fabled deity or giant could ever have accomplished.

These words would have had little weight had they fallen from the mouth of a self-educated millionaire manufacturer, whose fortune was due to his ability in employing labour, buying and selling; but they are wonderfully significant, coming from one of the most accomplished scholars and successful men that Oxford University ever produced. Professor Huxley, in returning thanks for the learned societies, observed that "civil engineering and "medicine, taken together, constitute the practical outcome of all "physical science;" and he continued in words well worth remembering:

There is yet another profession, or what is now rapidly assuming the rank of a special profession—namely, the pursuit of abstract science itself—which also, and even more eminently than either of those which have been mentioned, deserves the title of "noblest," for without it neither of these great practical professions would have any safe foundation or substantial existence. This statement of the dependence of practice upon theory is understood by civil engineers to be founded in fact; their recognition of that truth is of more importance now, in consequence of the many movements in this country in favour of technical education. It is highly desirable that a body like the civil engineers should exert their great and legitimate influence to enforce upon the public mind the truth, that there can be no technical education of any value or soundness which is not based on a thorough preliminary training in abstract or theoretical physical science.

THE VENTILATION OF SEWERS.

It may seem strange that in these days it should be considered necessary to say anything in advocacy of the effective ventilation of sewers, but that some such advocacy is deemed necessary would appear to have been Mr. Baldwin Latham's apology for bringing the subject recently before the Society of Engineers. The necessity granted, there still remains the consideration of the best means to employ for the purpose. Two things have to be provided for—the escape of foul air from sewers, and the access of atmospheric air to sewers, the one being no less necessary than the other. Ample openings being provided in proper situations, the results might be safely left to the operation of natural laws; but the question remains, where are these openings to be made?

The complete exclusion of sewer gases and vapours from private houses would seem to be a hopeless problem. Place the most perfect contrivances for the purpose in one of our best houses, and so great is the ignorance, or so gross is the carelessness, that it may be safely said the apparatus would not remain in effective operation for a week. Just, however, as sufficient means of ventilation are provided outside houses, so is the risk of the contamination of the air inside avoided. Air, as Mr. Latham says, will escape at the point of least resistance, and ample openings being made in the streets, there is the less chance of sewer air finding its way by tortuous passages into houses.

So far the matter seems simple enough, but two other points remain for consideration. Sewer gas escaping into the streets may poison the passers by, and also get into the houses, though in a diluted, but possibly not altogether harmless state. It is advisable, therefore, if possible, to carry the air out of the way of passers by, and beyond the possibility of gaining access to houses. All the artificial means hitherto devised to effect this object have failed, and with those suggested, but up to this time untried, there would seem to be little hope of success. There remains the desirability either of preventing the formation of noxious gases within the sewers, or of providing means for their absorption and destruction before they can reach the outer air. The first of these, we may say, is an impossible object. The use of chemical anti-putrescents would be far too expensive for their employment, and the result of their action too uncertain to be relied upon. The use of a material to absorb and destroy the noxious emanations is a much more promising mode of dealing with them, and happily we have in charcoal a material the utility of which has been demonstrated by a thousand experiments. Mr. Latham lends his support to the use of charcoal filters for sewer air, and has devised a form of filter which obviates most of the objections to those that have hitherto been employed. The success of such filters is no doubt assured, but a general application of them is never likely to be made, and we shall have to rely on the simplest and best mode of ventilating sewers ever adopted—namely, free openings into the streets. This simple system, it is admitted, has produced the happiest results in London, and wherever capacious brick sewers are in use, no better could be employed. If ever again pipe sewers, as at Croydon, should be made use of, a more artificial system of ventilating would be required. In a properly constructed system of sewers, however, it can never be a difficult problem how to provide for the free egress and access of air from and to sewers, with the minimum of risk of the foul escaping gas finding its way into houses, and producing discomfort if not disease.

Circular to Gas Companies.

The Gas-Works Clauses Amendment Bill (No. 2) has been printed since our last issue, and we regret to find that it does not altogether fulfil the favourable expectations we had formed from an examination of some of the Provisional Orders granted when we last referred to it. In this Bill we find the objectionable clauses of the original Bill with regard to the maps required to be prepared of the main-pipes, &c., the testing for sulphur compounds other than sulphuretted hydrogen, and for ammonia; and also for the deposit of accounts in the nine forms scheduled in the Bill. Thus it is seen that, although much has been conceded to the opposition by the Board of Trade, there still remains a good deal against which we feel bound to protest. By some inexplicable neglect however, the Bill has been suffered to be read a second time unopposed, and notice has been given for considering it in committee on Monday, May 15. There is, therefore, no time to be lost if any attempt is to be made to amend it by striking out or modifying the objectionable provisions. It is not probable that the House will listen to these objections in committee, and the

proper course seems to be to get it, if possible, referred to a Select Committee, with power to the committee to hear evidence.

We will point out the provisions as they stand in the Bill, against which strong objections ought to be made. The first is the general application of this Bill, and the Gas-Works Clauses Act, 1847, to every company who may hereafter apply for statutory powers. It is, indeed, allowed that the provisions may be expressly varied or excepted in special Acts and Provisional Orders; but this proviso is hardly sufficient for the protection of small companies who might by inadvertence be made liable to the full operation of the Act. Any exceptions, too, would be inconsistent with the principle of all the Consolidation Acts hitherto passed. The provisions with respect to compulsory supply also require modification. It would be monstrous to compel a company to lay down 150 feet of pipe to supply a single public lamp. The injustice of compelling a supply to public lamps at the lowest price charged to private consumers, we have so frequently alluded to, that it is not necessary to refer to it here again. It must be evident to every one but the officials of the Board of Trade, that such a provision, while unjust in itself, is calculated to defeat the chief object of the Bill, which, it is professed, is to lower the price of gas. The glaring inequality in the penalties prescribed by the Bill may be strongly remonstrated against. A consumer who systematically cheats a company over a long period can only be fined £5; but a company who may but for a single day fail to keep the illuminating power of their gas up to the required standard, may be fined £50.

The clause which would compel every company to provide a map of their limits is open to very strong objections. It must be on a sufficient scale to allow not only the lines of the mains, with their sizes and depths, but also the positions of all valves, syphons, and other appliances to be indicated thereon. The Board of Trade can hardly have considered what the cost of preparing such a map must be, and how impossible it would be for little companies to comply with such a provision, except at a charge which, as it would be nearly ruinous to the company, must certainly increase the price of gas. In most cases it would necessitate a special survey of the district, and the preparation of plans on a very large scale, for even the Ordnance maps of 60 inches to the mile have been found to be too small for the purpose. These, moreover, and the 6-inch maps have as yet only been prepared for the large towns, and the 1-inch map is the only one as yet accessible to the country at large. The 6-inch map, where it can be had, is wholly insufficient for marking anything more than the lines of mains. Thus the preparation of the maps required must, in most instances, entail a serious cost on the companies, which can only have the effect we have mentioned above. And, after all, it may be asked, What useful purpose can such maps serve?

The provision which would require a company to provide testing apparatus at any prescribed place is also open to the objection that it would entail an nnnecessary expense on the company. There is, or should be, the means of testing gas at all gas-works, and it is there that the testings should be made. Any objections that could be brought to this arrangement would be fully met by the appointment of the inspector proposed by the Board of Trade, whose duty it would be to verify the apparatus in use. There is, further, a downright absurdity in compelling every little company to provide apparatus for the determination of sulphur in other forms than sulphuretted hydrogen, and for the estimation of ammonia—apparatus which it is tolerably certain will never be used. It ought to be specially provided that this provision should not apply to towns having, at the last census, a population of less than 20,000, or to companies having a paid-up capital of less than £20,000.

Against the provision which would require every little gas company to keep accounts in the complicated forms required by the Bill we have before remonstrated, and need only repeat that, while it would, in most cases, require a company to incur the expense of a professional accountant, no useful end is likely to be gained. There are people, we know, who advocate a general sumptuary law, which would require every one to make a return of his income and expenditure. Such a law would, no doubt, have very useful results; but we see no reason why gas companies should be the only victims of such an enactment.

For these reasons, and others that might be alleged, we recommend gas companies not to relax in their opposition to a measure which is calculated to inflict on them needless expense and vexatious proceedings, and which is not likely to operate for the public good.

Forms of petitions, duly prepared, to aid in carrying out the suggestion made above, may be obtained from Messrs. Waterlow, the law stationers, of 49, Parliament Street; and we advise the presentation of as many petitions as possible before the 15th inst.

Since we wrote last the Board of Trade have introduced a Bill to confirm Provisional Orders granted under the Gas and Water Works Facilities Act, 1870, to ten gas companies, one gas and water company, and nine water companies. The gas companies to which Orders have been granted are as follows:—Birkdale, Bognor, Hawkhurst, Northampton, North Middlesex, Pembroke Docks and Town, Southbank and Normanby, Staines and Egham, Stourbridge, and Taunton. Combined powers are granted to the Knutsford Gas and Water Company. As we mentioned in our last, an Order applied for by the Plymouth and Stonehouse Gas Company has been refused. The Bideford Gas Company have also failed to obtain an Order.

The committee to which the group of Bills connected with Aberdeen were referred have passed the Corporation Bill empowering them to purchase the gas-works on condition that the Corporation give 10 per cent. annuities instead of the 9 per cent. offered; that they supply 30-candle gas; and make no differential charge to consumers outside the limits of the borough. Five other Bills for the transfer of gas undertakings to municipal bodies are quietly passing their several stages; and it is understood that the Corporations of Chester, York, and Ryde are in treaty for the purchase of the works now supplying gas in those localities.

A most excellent map of London and its environs, from Kew to Barking, and from Norwood to Tottenham, showing the districts of the several metropolitan gas companies, and the positions of their manufacturing and storing stations, has just been issued by Mr. Wyld, of Charing Cross. It is on a sufficiently large scale—3¾ inches to the mile—to show the limits with definite accuracy. The want of such a map has long been felt by the gas interest in the metropolis, and the publication, we may be sure, will meet with the success the enterprise deserves. It will soon be followed, we hope, by another, exhibiting the limits of the water companies. Copies of the map can be obtained from our publisher.

A paper "On the Reduction of Light due to the Presence of Carbonic Acid in Illuminating Gas," by Mr. Stimpson, of Boston, U.S.A., which we also publish to-day, will be read with some interest. We do not remember that any recent experiments on the subject have been made, and the results are useful, as showing the advisability of the removal of carbonic acid as completely as possible. With ordinary gas we do not think there is any fear of arresting any portion of the illuminating ingredients of the gas while purifying it from carbonic acid.

Communicated Article.

SOME FURTHER EXPERIMENTS ON THE RATIO OF INCREASE OF THE ILLUMINATING POWER OF COAL GAS.

By Charles Hunt, F.C.S.

No. 2.

In continuation of the above subject, I propose to submit some results of a further investigation in the direction indicated in my communication published in the Journal of Gas Lighting in June last.

It appears to me that the practical value of this question is very much, if not wholly, confined in its application to those burners which are accepted as the standards for gas testing, since it is evident that no others are ever likely to be used for any purposes of authoritative research. By confining our attention to these burners, also, we narrow the issue, and are consistent to the belief that one good witness is worth more than ten bad or doubtful ones.

Accordingly I take Sugg's small "London" as the standard for common gas, varying say from 14 to 17 candles illuminating power per 5 feet consumption, and from trials with different qualities of gas within the above limits I obtained the following results:—

No. 1.—Small "London" Burner, Chimney 1⅛ inch diameter.

Height of Chimney.	Pressure in Inches.	Consumption per Hour. Cubic Feet.	Comparative Value. Standard of Comparison = 1.	Proportionate Value of 5 Feet, according to Rule of Three.
6 inches ..	0·80 ..	5·148 ..	1·041 ..	1·011
4¾ „ ..	0·52 ..	4·284 ..	0·888 ..	1·036
4¼ „ ..	0·42 ..	4·008 ..	0·823 ..	1·027
3¾ „ ..	0·30 ..	3·576 ..	0·716 ..	1·001

Normal range of burner = 1·572 cubic feet. Difference between extremes of proportionate values = 3·37 per cent.

No. 2.

6 inches ..	0·87 ..	5·388 ..	1·063 ..	0·986
4¾ „ ..	0·58 ..	4·416 ..	0·904 ..	1·023
4¼ „ ..	0·47 ..	4·110 ..	0·844 ..	1·026
3¾ „ ..	0·35 ..	3·720 ..	0·741 ..	0·996

Normal range = 1·668 cubic feet. Difference between extremes of proportionate values = 3·89 per cent.

No. 3.

6 inches ..	0·82 ..	5·424 ..	1·025 ..	0·945
4¾ „ ..	0·57 ..	4·500 ..	0·860 ..	0·955
4¼ „ ..	0·41 ..	4·056 ..	0·767 ..	0·945
3¾ „ ..	0·32 ..	3·756 ..	0·720 ..	0·958

Normal range = 1·668 cubic feet. Difference between extremes of proportionate values = 1·35 per cent.

No. 4.

6 inches ..	0·73 ..	5·320 ..	1·311 ..	1·126
4¾ „ ..	0·55 ..	4·870 ..	1·154 ..	1·184*
4¼ „ ..	0·44 ..	4·560 ..	1·040 ..	1·140
3¾ „ ..	0·35 ..	4·248 ..	0·949 ..	1·117

Normal range = 1·572 cubic feet. Difference between extremes of proportionate values = 5·65 per cent.

* The flame in this trial was slightly above the top of the chimney.

I think these figures afford a pretty fair argument in favour of the retention of the old rule, so far at least as this burner is concerned, since nothing more is required to bring about results in accordance with it, than an alteration in the height of the chimney to suit the diminished consumption. It has been repeatedly pointed out by different observers that the greatest proportionate illuminating power is obtained from an Argand burner at the highest practicable consumption, or when the top of the flame is about level with the top of the chimney, and on the point of smoking; and this fact was kept sight of in the extended series of experiments detailed above.

The normal range in this case is indicated by the extremes of the chimneys employed, and it is important to bear in mind that the most perfect luminous development is apparent when the height of the chimney is made to correspond with the height of the burning gas; this being applicable as well to *variations in quality* as to different rates of consumption. We are thus furnished with an instance in which the best obtainable results, with the best known burner, are compatible with perfect conformity to the law of simple proportion.

I have not included in my examination the 1¾-inch chimney, which, according to the instructions of the referees, is used when the gas is too rich to burn with the smaller one. But there is no reason to suppose that it would give different results; and I have omitted it simply because of the uncertainty which still exists as to the advantageous employment of the Argand for these richer gases.

I now turn to the consideration of the standard burner for cannel gas, which is a steatite bat's-wing.

Mr. Pole, in his recent able article on the "Theory of Gas-Burners," has stated that "universal experience with naked flames proves that the law of simple proportion is not the true one." This is rather an extreme statement, inasmuch as Mr. Pole himself supplies, in the experiments which he has put forward in support of his theory, an exception to it; and it was this exception which attracted my attention more closely to that class of burners of which the one now under consideration is a type. My experiments have not been confined to it only. I have tried several very good cannel burners, and it has pleased me very much to find that their evidence is in accordance with my own convictions, and entirely in favour of the old rule. Agreeably, however, to the suggestion thrown out at the commencement of this paper, I propose to give only the results of the trials with the standard cannel burner.

No. 5.—Standard Cannel Burner.

Gas consumed per Hour. Cubic Feet.	Pressure at Point of Ignition. Inches.	Illuminating Power. Sperm Candles.	Value of 5 Feet, according to Rule of Three.	
10·632	1·40	48·41	22·76	
10·248	1·30	47·35	23·10	
9·744	1·18	44·46	22·81	
9·240	1·09	43·47	23·52	
8·748	0·98	41·57	23·75	Normal range =
8·140	0·88	39·95	24·54	3·468 cubic ft.
7·908	0·82	38·35	24·24	Difference be-
7·248	0·65	35·08	24·19	tween extreme
6·408	0·50	31·16	24·31	proportionate
5·832	0·42	28·34	24·29	values = 3·2
5·280	0·34	25·38	24·03	per cent.
4·584	0·25	21·00	22·90	
3·900	0·17	18·08	23·18	
3·216	0·12	15·22	23·66	
2·580	0·08	10·65	20·64	

No. 6.

In the following, a richer gas is employed:—

10·596	1·45	62·78	29·62	
9·624	1·30	61·94	32·18	
9·096	1·20	60·17	33·07	
8·676	1·11	58·31	33·60	Normal range =
7·884	0·95	53·46	33·90	3·828 cubic ft.
7·524	0·90	51·22	34·04	Difference be-
6·864	0·80	46·81	34·09	tween extreme
6·276	0·70	43·06	34·30	proportionate
5·496	0·60	37·83	34·41	values = 2·35
4·848	0·50	32·69	33·71	per cent.
4·236	0·40	27·71	32·70	
3·060	0·20	18·20	29·73	
1·488	0·05	7·09	23·82	

Here the normal range is indicated by the extent of conformity to the law of simple proportion, subject to a trifling limit of error which must be conceded in all experiments of this nature.

I have thus endeavoured to show that coincident with the best obtainable development of illuminating power, the results are conformable to what has been called the "old assumption." I can conceive no more satisfactory way of vindicating its accuracy, for it seems to me an inevitable condition of such an investigation that we reject the evidence of burners whose testimony as to quality we daily pronounce to be inadmissible.

It may not be amiss to point to the fact that in the two latter experiments the comparative values obtained at the highest rates of consumption, and consequently at the highest pressures, considerably exceed those obtained at the lowest rates, and where of course the lowest pressures prevailed. This is by no means the only case which has come under my notice, and it seems difficult at first sight to reconcile with the generally accepted and apparently well-grounded belief in the mischievous influence of pressure; but if we bear in mind that the object to be attained is to bring the burning gas into contact with just the quantity (and no more) of air required for perfect luminous combustion, the solution becomes easy. In the best Argands, the very large area of the outlets permits of the egress of the gas at the lowest possible pressure, while at the same time almost every particle of the fluid is fairly exposed to the atmosphere. But it clearly will not do to rely on the fulfilment of this condition alone for good results, for if we use the burner without the chimney we get a flickering, smoky, feebly luminous flame. The chimney alters all this; it sharpens the draught of air and steadies the flame, and when, as in the case of Sugg's "London," it is supplemented by a regulating cone, which directs the air current to the outer ring of the burner, the results are very satisfactory. Experience, however, has not yet decided in favour of the adoption of these principles in the consumption of cannel gas; and, consequently, so long as we have to deal with the flat-flame burners, the question is, what is the best substitute for the chimney and regulating cone? After mention has been made of the glass moons in common use, which are at the best unsatisfactory, our stock of contrivances seems to be exhausted, and we therefore fall back upon such a moderate pressure as will ensure the required contact with the air, and draw as it were a sufficient supply to the burner, so far as the shape of the latter will permit. This explanation accounts, I think, for the evidence to which I have referred, in which it will be seen that the greatest illuminating power is developed at the medium pressures. It would simply be impossible to fix any particular limit to the amount of pressure, which must vary with almost every burner, upon the shape of which a great deal depends.

Time alone will show whether the principle of the Argand can be successfully applied to cannel gas, or whether improvements may not take an opposite direction, and lead to the substitution of flat-flame burners for those now used for testing common gas.

Correspondence.

THE GAS-WORKS CLAUSES ACT (1847) AMENDMENT BILLS.

SIR,—I do not know what you will be pleased to say, in your publication of to-morrow, respecting the new bill introduced by the Board of Trade (Bill No. 2), for the "*Amendment of the Gas-Works Clauses Act*, 1847," but I beg to be allowed to state, for the benefit of the gas companies (whether incorporated by special Acts of Parliament or otherwise), that the bill in question bristles with most objectionable provisions, and that it is the duty of all gas companies and gas and water companies to petition against the bill, and to beg of their local members to be good enough to look after the measure, and to get it referred to a select committee, or altogether thrown out.

The Bill No. 1 contained provisions so unreasonable that its promoters were constrained to withdraw it. This Bill No. 2 is freed from some, but not by any means from all, of the objectionable provisions contained in No. 1 Bill.

The Bill No. 2 was read a second time on Friday night, or rather on Saturday morning, and will go into a committee of the whole House on Monday next, if the companies, by means of their friends in Parliament, do not succeed in getting it referred to a select committee, where its provisions may be rendered fair alike to the companies and to the consumers. If the bill be referred to a committee of the whole House, there is no possibility of its details receiving that amount of consideration which the importance of the measure demands—a measure affecting many millions of property invested in gas and gas and water companies.

I deem it right to state that this bill concerns the small companies not as yet incorporated by special Acts of Parliament quite as much as—perhaps more than—the companies incorporated by special Acts; and, therefore, that *those small companies ought promptly and at once to bestir themselves.* They ought, moreover, it is submitted, to join the Gas and Water Association, for mutual protection and support.

JOHN MAUGHAN,
Chairman of Leamington Gas Co., and otherwise much interested in gas companies.

7, *Lancaster Terrace, Regent's Park, N.W., May* 8, 1871.

P.S.—Companies to whom the preparation of a petition may be inconvenient had better apply to Mr. W. Livesey, the lately appointed secretary of the Gas and Water Association, to forward a petition ready for sealing or signing. Mr. Livesey's address is 6, Victoria Street, Westminster, S.W.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, APRIL 24, 1871.

The SUTTON AND CHEAM WATER; the CRADLEY HEATH GAS; the WESTHOUGHTON GAS; and the ILKLEY GAS Bills, were read a second time, and committed.

TUESDAY, APRIL 25.

The ILKLEY GAS Bill was reported.

The SUTTON AND CHEAM WATER, and the CRADLEY HEATH GAS Bills, were reported, with amendments.

The CHORLEY IMPROVEMENT Bill was read a third time, amendments made, Bill passed, and sent to the Commons.

THURSDAY, APRIL 27.

The WESTHOUGHTON GAS, and the STAVELEY WATER Bills, were reported, with amendments.

The BROMSGROVE AND DROITWICH WATER Bill was brought from the Commons, and read a first time.

FRIDAY, APRIL 28.

The GREENOCK POLICE, IMPROVEMENT, AND GAS; BATLEY CORPORATION WATER; LOUTH WATER; GASLIGHT AND COKE COMPANY; CEFN, ACREFAIR, AND RHOSYMEDRE WATER; RHYL DISTRICT WATER; and DUNSTABLE GAS AND WATER Bills, were read a second time, and committed.

The ILKLEY GAS Bill was read a third time, and passed.

The CRADLEY HEATH GAS, and the SUTTON AND CHEAM WATER Bills, were read a third time, with the amendments, passed, and sent to the Commons.

The WARRINGTON GAS Bill was brought from the Commons, and read a first time.

The BOSTON GAS Bill was returned from the Commons, agreed to, with an amendment. The said amendment considered, and agreed to.

MONDAY, MAY 1.

The LOUTH WATER Bill was reported, without amendment.

The ILKLEY LOCAL BOARD; SHEPPY GAS; and FOLKESTONE WATER Bills, were read a second time, and committed.

The STAVELEY WATER Bill was read a third time, passed, and sent to the Commons.

The WESTHOUGHTON GAS Bill was read a third time, with the amendments, passed, and sent to the Commons.

TUESDAY, MAY 2.

The FOLKESTONE WATER Bill was reported, with amendments.

THURSDAY, MAY 4.

The DUNSTABLE GAS AND WATER Bill was reported, with amendments.

The KIDSGROVE GAS Bill was brought from the Commons, and read a first time.

The LOUTH WATER Bill was read a third time, and passed.

FRIDAY, MAY 5.

The FOLKESTONE WATER Bill was read a third time, with the amendments, passed, and sent to the Commons.

The WATFORD GAS Bill was brought from the Commons, and read a first time.

The CRADLEY HEATH GAS, and the SUTTON AND CHEAM WATER Bills, were returned from the Commons, with the amendments agreed to.

The GREENOCK POLICE AND IMPROVEMENT Bill, and the BATLEY CORPORATION WATER Bill, were referred to a Select Committee, consisting of Earl Graham (chairman), Earl Dartmouth, Viscount Powerscourt, Viscount Hutchinson, and Lord Eliot, who will sit on Monday, May 8, at eleven o'clock.

HOUSE OF COMMONS.

MONDAY, MAY 24.

The BOSTON GAS and the WARRINGTON GAS Bills, as amended, were considered.

The HUDDERSFIELD IMPROVEMENT; HUDDERSFIELD WATER; and WANDSWORTH GAS Bills, were read a second time, and committed.

The INCE WATER Bill was read a first time.

Petitions were presented against the GAS-WORKS CLAUSES ACT (1847) AMENDMENT Bill, from the following companies:—Southport Water, and Sheffield Water; and from the following gas companies:—Sheffield, Penistone, Thurlston and Oxspring, Dorchester, Brierley Hill District, Dudley, Malton, Radcliffe, Pilkington, and Hornsey.

TUESDAY, APRIL 25.

The DUNDEE WATER; FORFAR GAS; and BRADFORD CORPORATION GAS AND IMPROVEMENT Bills, were reported.

The BROMSGROVE AND DROITWICH WATER Bill was read a third time, and passed.

The WATERFORD WATER Bill was read a second time, and committed.

GAS-WORKS CLAUSES ACT (1847) AMENDMENT Bill.—Petitions were presented against the Bill, from the Leicester Gas and the Newport Gas Companies.

WEDNESDAY, APRIL 26.

The SOUTH LANCASHIRE WATER Bill was read a first time.

THURSDAY, APRIL 27.

The BOSTON GAS Bill was read a third time, and passed, with an amendment.

The WARRINGTON GAS Bill was read a third time, and passed.

FRIDAY, APRIL 28.

The KIDSGROVE GAS Bill, as amended, was considered.

The CHORLEY IMPROVEMENT Bill was read a first time.

GAS-WORKS CLAUSES ACT (1847) AMENDMENT Bill.—A petition against the Bill was presented from Neath.

MONDAY, MAY 1.

GAS-WORKS CLAUSES ACT (1847) AMENDMENT (No. 2) Bill.—A petition was presented against the Bill, from Bolton.

The ABERDEEN MUNICIPALITY EXTENSION Bill, and the ABERDEEN GASLIGHT COMPANY'S Bill, were reported.

TUESDAY, MAY 2.

The KIDSGROVE GAS Bill was read a third time, and passed.

GAS-WORKS CLAUSES ACT (1847) AMENDMENT (No. 2) Bill.—A petition was presented against the Bill, from the Liverpool Gas Company.

The LIVERPOOL IMPROVEMENT AND WATER Bill was reported.

The DUBLIN MAIN DRAINAGE; the NEWRY BOROUGH IMPROVEMENT AND WATER SUPPLY; and the ALLIANCE AND DUBLIN CONSUMERS GAS Bills, were referred to a Select Committee, consisting of Mr. Sturt (chairman), Mr. Norwood, Mr. Bowring, and Mr. Jackson, who will sit on Thursday, May 11, at twelve o'clock.

WEDNESDAY, MAY 3.

The INCE WATER Bill was read a second time, and committed.

GAS-WORKS CLAUSES ACT (1847) AMENDMENT (No. 2) Bill.—A petition was presented against the Bill, from Farnworth.

THURSDAY, MAY 4.

The CRADLEY HEATH GAS, and the SUTTON AND CHEAM WATER Bills.—The Lords amendments were agreed to.

The WATFORD GAS Bill was read a third time, and passed.

FRIDAY, MAY 5.

GAS-WORKS CLAUSES ACT (1847) AMENDMENT (No. 2) Bill.—Petitions against the Bill were presented from the Leamington Priors Gas Company, and the Brighton and Hove Gas Company.

GAS-WORKS CLAUSES ACT (1847) AMENDMENT (No. 2) Bill.—A petition in favour of the Bill was presented from Winchester.

The GAS-WORKS CLAUSES ACT (1847) AMENDMENT (No. 2) Bill was read a second time, and committed for Monday, April 15.

GAS AND WATER PROVISIONAL ORDERS CONFIRMATION Bill, to confirm certain Provisional Orders made by the Board of Trade, under the Gas and Water Facilities Act, 1870, relating to the ALDEBURGH WATER; BIRKDALE GAS; BOGNOR GAS; BOGNOR WATER; PURGESS HILL AND ST. JOHN'S COMMON WATER; FROME WATER; GISBOROUGH WATER; HAWKHURST GAS; HERNE BAY WATER; HOLYWELL WATER; KNUTSFORD GAS AND WATER; NORTHAMPTON GAS; NORTH MIDDLESEX GAS; PEMBROKE DOCKS AND TOWN GAS; PORTMADOC WATER; SOUTHBANK AND NORMANBY GAS; SOUTHEND WATER; STAINES AND EGHAM GAS; STOURBRIDGE GAS; and TAUNTON GAS, was read a first time.

HOUSE OF LORDS.

(*Before the Earl of* DEVON, *Chairman; Earl* TANKERVILLE, *Lord* DELAMERE, *Earl of* AIRLIE, *and Lord* SEATON.)

CLEVELAND WATER BILL.

MONDAY, MARCH 27.

Mr. RODWELL, Q.C., and Mr. LITTLER appeared for the promoters; Mr. CALVERT, Q.C., and Mr. SHIELL for the petitioners.

Mr. RODWELL, in opening the case, said that the object of the bill was to obtain powers for extending the limits of the present Cleveland Water Company, to create additional capital, and for other purposes. At the outset it would be necessary to inform the committee that the company was formed under an Act of Parliament in 1869, and that by that Act certain districts were assigned to them as their limits of supply. It was promoted by a certain number of gentlemen living in the neighbourhood for the purpose of supplying the district, who took power to obtain the water from Moorsholm Beck, running by the estate of a Captain Linskill, who was one of the opponents of the bill, and who owned for some distance one side of the stream. When the company were before Parliament in 1869 the committee authorized them to take water from the stream, under agreement from Captain Linskill, but they were limited as to quantity. It was decided they should take one-third of the minimum supply of 600,000 gallons a day—viz., 200,000 gallons, and that quantity the company conceived would be sufficient for their purpose, so that they left Captain Linskill the remainder. Last year, however, the supply was not more than about 200,000 gallons, so that the company did not obtain, in round numbers, as their one-third, a supply of over 70,000 gallons, which, of course, was wholly inadequate to meet the wants of their customers. The demand for water had increased considerably, and it was in order to meet the growing wants of the district they had been compelled to seek from Parliament further powers. He would ask their lordships to bear in mind at starting that Captain Linskill had but a limited ownership in the water stream, and that he had no more right to take the water and use it for his own purposes than those who had lands miles above him; at all events, he had no power to divert the stream supposing there were mills below him. Well, by the bill which the promoters had introduced, they proposed to repeal certain clauses which referred to Captain Linskill's supply, and to take power for the erection of a large storeage reservoir to enable them to retain the flood water, an enormous quantity of which during the winter season went to waste, and so that they might secure 92 million gallons, or an equivalent to 509,000 gallons per day. What they proposed to do was to take one-third of the area of the watershed due to the stream, and instead of taking one-third, which Parliament entitled them to do, of the minimum supply of water, subject to certain fines, they would take what would be precisely the same thing, as far as Captain Linskill was concerned—they proposed to take one-third of the watershed of 2800 acres, and so secure the water before it found its way into the stream. The only petitioner was Captain Linskill, and he said that unless the company came to certain terms, which they considered to be simply ridiculous, he would stop the supply as far as he possibly could. The company had no desire whatever to interfere with the stream so as to deprive Captain Linskill of that which was clearly his right, but the demand in the district had so largely increased by the land being opened for ironstone workings that it was impossible the people could get sufficient water for their daily wants unless Parliament sanctioned an extension of the company's territory. Upwards of 5000 acres, immediately contiguous to Captain Linskill's property, had been let for ironstone purposes, and the people who, in consequence, had been brought into the district, required water, which it was impossible to give them under the present ordinary supply. With a view of getting rid of Captain Linskill's opposition, the company had offered to supply his estate with any quantity of water he might require at a price of 6d. per 1000 gallons, which to him would be a far cheaper mode of obtaining water than having to pump it from the stream; and, moreover, they were ready to supply, free of all charge, a trough for agricultural purposes. When the company first proceeded with their works they had a great number of obstacles thrown in their way by Captain Linskill, and a correspondence, extending over nearly twelve months, ensued before they were able to make the arrangements which were necessary and essential to their scheme. He suggested, in fact, all sorts of things, and said they were endeavouring to steal his water; in one case by putting down a larger pipe than they ought to. They satisfied him, however, that he was under a delusion on that subject, and then he attacked them with extravagance. Strong feelings appear to have possessed his mind from the first, and they found him to a certain extent impracticable, but they trusted now to see his opposition overcome, and a friendly feeling established between them. The capital of the company was £28,000. They proposed to borrow £9000, which they believed they could readily do from gentlemen in the neighbourhood who were interested in it. Powers were asked for, to take one-sixth of the flood water, and more at a future time; and he defied any one to say that by doing this they would injure Captain Linskill. The committee of 1869 gave the company power to take one-third of the minimum, which amounted to 200,000 out of 600,000 gallons, but that was not now sufficient to meet the increased demands which had arisen in the neighbourhood. In conclusion, the learned gentleman said that the promoters believed they would be doing Captain Linskill no harm by extending their means of supply in the manner proposed; but that, on the contrary, they would do him much good, and, therefore, he trusted their lordships would say that the bill was one that ought to be proceeded with.

Mr. *W. Cockburn*, examined by Mr. RODWELL.

I am a mining engineer, residing at Cleveland, and manage the working of Messrs. Theasey's ironstone mines which are the largest in the district. I am acquainted with the whole of the neighbourhood from which it is proposed to supply, and the stream from which the water is to be taken. The ironstone workings have dried up the springs, and the district has no supply of water except what can be obtained from the company. It is a very sorrowful state of things indeed. From Marske to the Lofthouse there is a continuous supply of iron. The quantity of ironstone worked in Cleveland amounts to 3½ million tons annually. About 13,000 tons per week, or a million and a half tons per annum, comes immediately out of the district for which a water supply is now being sought. We experience great difficulty in getting men to work the mines on account of the scarcity of water. Redcar is a watering-place much frequented in summer by persons from the West Riding. At present it is supplied with water by a spring situated immediately below the ironstone working. All the streams in the district are being gradually dried up.

By the COMMITTEE: The population of Redcar, generally speaking, is about 2500. During the summer it is increased to about 5000. Marske is supplied by a well sunk from the surface. There is no danger of its being dried up from the effects of the ironstone workings, but the water is of such an inferior quality that people can scarcely use it. We have had to obtain other water for our own tenants rather than leave them to use it. Water has been conveyed to them in carts from a distance of 3½ miles. The population of Marske is about 2700 souls. The "output" of stone in the district which the Cleveland Company proposes to supply under the bill is 13,300 tons per day. There are now upwards of 5000 acres of ironstone to let. Saltburn is supplied by the company, but last summer there was great difficulty in getting water in sufficient quantities for domestic purposes. Captain Linskill has only the right to the water on one side of the stream. It costs him more money now to get water up to his estate than it would do if the company were empowered to lay their pipes there. Supposing that he required 10,000 gallons a day, I calculate that it would cost him £150 a year in pumping alone. If he accepted the offer of the company, he would be able to obtain the same quantity at 6d. per 1000 gallons, without having the trouble of pumping, or running the risk of breaking his engines. If he should let his land for ironstone workings, it would not be worth anything as a site for a country residence. The company have undertaken to supply him with water for his cattle without charge. I estimate the value of the ironstone in this district at 6d. per ton, and there are about 20,000 tons per acre. Upwards of 1000 tons daily could be worked. If the company took their pipes in the way proposed, they would confer upon him a boon of immense value. At present the income of his estate does not amount to more than £300 per annum.

Cross-examined by Mr. CALVERT: If a company was brought there for the

purpose of working the ironstone, the right to the water on the part of Captain Linskill would, of course, become more important. Had nothing to do with the bill of 1869. The water would be pumped from the beck.

Mr. *A. L. Stevenson*, examined by Mr. RODWELL.

I am a mining engineer, residing at Durham, and am employed by Messrs. Bell Brothers, from whose works 1000 tons of stone are procured daily. We are sinking other pits from which we expect to get a similar quantity. The supply of water has been exceedingly limited, and much disease has arisen in consequence amongst the inhabitants of the district. A better supply is absolutely necessary, and unless it is obtained, I do not know what will become of the district. I think that if Captain Linskill were wise, he would immediately commence working the ironstone on his estate; but without some better supply he would be unable to do so, at least with any considerable advantage.

Cross-examined by Mr. CALVERT: I think that Captain Linskill's estate should be devoted to ironstone-works. If he worked his ironstone, however, he would destroy it as a place of residence.

Mr. *E. Bell Hamilton*, examined by Mr. LITTLER.

I live at Saltburn, and am agent for Messrs. Wharton, who have an estate of about 10,000 acres in that locality. A great portion of it has ironstone underneath. The development of ironstone has been very great since 1869. I have let 1400 acres myself since then. I believe that sooner or later it will be necessary to tap the springs in the district. There are constant complaints of the springs being dried at a considerable distance. Springs which were before thought to be constant have been tapped by the working of the ironstone. It is necessary decidedly for the prosperity of the district that it should have a better water supply. I do not think that the health of the district can be maintained without it. During last summer there was but a very small supply from the stream which comes down past Captain Linskill's estate. In 1869 it was calculated that the smallest flow would be 600,000 gallons a day. Last year, during the dry season, it was something under 200,000, and there being one-third for the water company, about 70,000 gallons only were left for them. Mr. Wharton is the owner of land both above and below Captain Linskill, and he is a strong supporter of the scheme on public grounds. In his judgment it is absolutely necessary for the wants of the district. Captain Linskill's cattle are watered now, excepting in a dry time, by a pond close to the house, upon a high part of the estate; in a very dry season it may be necessary to drive them down a narrow track, the only approachable point to the stream. If the scheme is carried out, he will have a better supply for his cattle. The pipe which was put in underneath the gauges was not put in with any intention of cheating or misleading the captain. It was done by the advice of the engineer, and the directors approved of the scheme. Instead of letting the flood waters run to waste, we propose to impound them off a certain portion of the present watershed and save them for dry seasons, and we are perfectly willing to let Captain Linskill have whatever water he wants, by means of pipes, at 6d. per 1000 gallons. Supposing he gets the water at that price on the land where his boilers will be for his ironstone, and supposing he gets his flood water for agricultural purposes, his estate, in my judgment, will not be damaged to the extent of one farthing, but will be benefited considerably. With all that valuable ironstone under the land, Captain Linskill is not likely to build a house there, because his estate is not a mile wide in any one place, and an ironstone mine, with 1500 people to work it living within less than a mile of his house, would be very undesirable. I cannot conceive that Captain Linskill would build a house there.

Cross-examined by Mr. CALVERT: I applied to Captain Linskill for leave to have the use of his water in 1868, simultaneously with the other owners upon the stream, and he refused it. We then set to work to get it without his permission. All the other owners, including Lords Zetland and Donne, gave a ready assent. The lower proprietors, it is true, have much more water to deal with. Captain Linskill filed a bill in Chancery to restrain us. In the autumn of 1868 we gave notice of a bill, and it was passed under the circumstances mentioned. We alleged that we wanted 75,000 gallons a day. Mr. Filliter, of Leeds, is our engineer now. I apprehend there was not a pipe put in by which a much larger quantity of water would be drawn off than was the subject of agreement. The engineer (Mr. Anderson) applied for a pipe to take the overflow from the mill stream for flushing purposes only, but, when not required for flushing purposes, some went into the well, and so, in order to save him the trouble of breaking up the floor of the well afterwards, the head of the pipe was placed in a certain position. The moment it was objected to it was removed. The pipe has not been shown upon the plan, but was agreed upon. First of all we asked for water, which was refused; then came an injunction, then an Act of Parliament and a clause to accept an agreement for a plan o deviation from the plan as to the pipe, and then the pipe objected to, which was withdrawn.

Re-examined by Mr. LITTLER: It is most important on sanitary grounds that the supply should be extended. It was only by threatening to apply to the Board of Trade that we obtained the final approval of Captain Linskill's engineer to the original gauges. The work was not completed for more than a year, and in the meantime we were paying him weekly a stipend of £2 during the delay. Sir H. Williamson, the chairman of the committee, certainly said: "We give you 200,000 gallons a day, which is more than double your requirements, and if in the course of time you require more, you must come and apply to Parliament again for it." We find that instead of getting at least 100,000 gallons in a dry season, we could only get 75,000 gallons; therefore, acting upon the suggestion of the honourable chairman, we have come again to Parliament for more water. The pipe referred to was perfectly water-tight, and not an ounce of water went through it. The population has been increasing so rapidly that it outruns the supply of water. The supply in 1868 was 200,000 gallons. The supply will always be less in consequence of the mines on either side drawing away the small streams into the lower level. I never remember such a dry summer as last year in that part of Yorkshire.

Mr. *J. Wharton*, examined by Mr. LITTLER.

I am the owner of about 10,000 acres of land in this neighbourhood. Several miles of the stream called Moorsholm Beck belong to me. About three-quarters of a mile or rather more belongs to Captain Linskill and another proprietor. I have taken, on public grounds, a very considerable interest in this water scheme. A better supply of water is necessary for the health and comfort of the district. We have had a great deal of illnsss in the district—much small-pox and fever. The present wants are nothing to be compared to what we are likely to require. I may mention that there are four pits now sinking upon my property, and by the agreement with the lessees they have put down machinery capable of raising 2000 tons of stone a day, and that will require the employment of 500 hands in each pit. In 1869 there was nothing like the prospect of increase that there is now. Since then the ironstone trade has taken a most unexpected start. If Captain Linskill looked at the value of his property he would work the ironstone. In a very few years I think the district, as a residential one, will be entirely spoilt. The population will be so large that I am afraid I shall not be able to live very much longer where I am. There has been no desire whatever to illtreat or deal unfairly with Captain Linskill; on the contrary, we have done everything we could to get over difficulties with him. If the Moorsholm Estate were mine, I should be exceedingly obliged to the water company for doing what we propose to do now for Captain Linskill. If he gets his agricultural supply free, and the water he wants by pipes, he will be much better off than with his present stream. There was not the slightest intention to cheat Captain Linskill with respect to the pipe referred to. As far as the interest of the company is concerned, I may say that I took shares in it, not from any motive of gain, but because I considered it absolutely necessary for the district. The water is now used for domestic purposes chiefly. The railway company are large consumers, and there is an hydraulic hoist which consumes a very considerable quantity at the season of the year when the water is scarce. The hoist is used to take people up and down the hill. The visitors to Saltburn Hotel go up and down in a bucket, at the end of the cliff, directly opposite the pier. It is a very steep and awkward hill for invalids. Sometimes they hoist as many as 1500 people in a day.

Cross-examined by Mr. CALVERT: I have a large quantity of land, which will be benefited by this scheme. I cannot see that anything is being done to Captain Linskill which is unfair or unjust. If his property were mine, I should prefer very much, and be obliged to the company for doing, what we propose to do for him. If the scheme is not carried out I do not see any prospect of this increasing population being supplied with water during the dry season of next year.

Mr. *W. Whitwell*, examined by Mr. LITTLER.

I am one of the directors of the company, and a blast-furnace proprietor and manufacturer. There has been a very large increase in the trade of the district since 1869. In that year the make of pig iron was slightly over 1,000,000 tons, and last year it was between 1,700,000 and 1,800,000 tons. It is increasing very rapidly; 51 out of 131 blast-furnaces get their supply from the district. The ironstone is brought in railway trucks to the smelting-works. It is absolutely necessary that some provision should be at once made for a further supply of water to this district. I cannot see any means by which the water can be supplied during the dry season of this year, unless works are at once commenced to collect it. The present scheme is the most feasible for carrying that out. We called in Mr. Filliter, and on his advice we are now proceeding. We have offered to furnish Captain Linskill with an agricultural supply for ever free—to supply the lessees of the captain with water, delivered at the works for the use of his boilers, at 6d. per 1000 gallons, and to pay him £300 in cash or, I believe, in the shares of the company, for bygone expenses, in order to induce him, as we thought, to be reasonable, and not force us to come to Parliament at a great expense, every other landlord having arranged personally with every other owner. Captain Linskill asked us to secure him the right to attach a 6-inch pipe from the company's main to his estate for ever, in order that the water might be carried to a certain elevation on his property. At present we have a small reservoir attached to two small filter-beds. The water is entirely supplied by gravitation. The fall varies considerably, but we have a very constant pressure, of something like 80 lbs. on the square inch at Saltburn; and we should have a very much larger pressure but for the use of a great pressure-valve, to make the pressure only sufficient for safety. We apply for power to collect one-third of the drainage area, which we considered to be exactly in accordance with the powers given before, and to collect one-sixth, if required, additional; and we considered that, in offering Captain Linskill the water on the terms we have named, we are more than compensating him for that additional sixth. There are many little streams which find their way into this beck, both above and below the reservoir. I wish to say that I corroborate entirely the remarks which have been made in reference to the good faith that has been kept as to this underground pipe. Our pipes for the present supply are laid down a wood, extremely hilly; they are laid down exactly as the ground lies, sometimes up and sometimes down, sometimes 20 feet lower down, to a sharp angle, and equally sharp up again. Mr. Anderson, our engineer, was extremely afraid that these would stop up with mud, as we had no filtering arrangements above; and he, consequently, laid very great stress, in 1869, upon the necessity of adding the flood water from the overwash of the hill. When he was carrying out the arrangement entered into, taking one-third by the brick meter put up on Captain Linskill's property, a question arose as to how he was to provide for taking this, and he found that the most convenient and satisfactory way was to put a pipe underneath it. There was no intention on the part of the company clandestinely to obtain more water than they had a right to.

Mr. *William I'Anson*, examined by Mr. LITTLER.

I am secretary of the company. During the year 1870 we supplied by meter 46,000 gallons a day on the average to our present district. We supply 453 houses not by meter. Reckoning that at six people per house, and 16 gallons per head per day, I have calculated that that comes to 43,488 gallons a day. During the summer the population of 190 houses at Saltburn, by reason of the visitors, would be doubled; that would make 1140 at 10 gallons a head per day, and the summer consumption will be 11,400 gallons a day, without allowing for any increase. During the months of April, September, and October of last year I gauged the stream on various occasions opposite to Captain Linskill's ganges, and found that the flow varied from half an inch to five-eighths.

Cross-examined by Mr. CALVERT: Of the 46,000, about 15,000 gallons per day were supplied for the hoist during the summer. The railway company take about 10,000 gallons besides.

Edward Filliter, Esq., examined by Mr. LITTLER.

I have been consulted as to the proposed works. I have been for 25 years engaged in water-works, particularly in Yorkshire. I am engineer of the Leeds Corporation and other water-works in that district of the county. The works at Leeds have been recently rearranged for the purpose of properly securing a supply to the town. The gathering-ground of the beck where this company now take their supply is about 2808 acres. There is a very small reservoir connected with the works. Indeed, it is scarcely to be called a reservoir, and their filter-beds do not contain more than about a day's supply for the town. Of course, the natural consequence is that there is no storing-ground, and all the flood water runs away at once, instead of being stored for a dry season. When I was first consulted as to obtaining an increased supply, I had my attention called to the conditions imposed in the Act of 1869, and I carefully considered the works so as to avoid injuring Captain Linskill's property. Of the gathering-ground of 2808 acres I propose to appropriate such a portion as the lie of the country will enable me to do. I was not able to take exactly one-third, and had to be content with something less than that—viz., 912 acres. The water from that district can be impounded by a reservoir—the Lockwood reservoir—and by one or two conduits. The result of that practically would be to leave Captain Linskill in a better position than he is in at present. We have had gaugings taken of the streams, and we find the actual streams which run from the Lockwood Beck, the Airedale Beck, and the Swansloe Dale Beck, which run through that 912 acres in dry weather, such as we have had in March, yield somewhat less than the one-third we are entitled to. There is a considerable number of springs which we do not take. I have had them gauged several times, and at the present time those springs, which are perennial springs, are now running 200,000 gallons a day. They are far below our conduit, and quite out of our power to extract. They are available for the riparian proprietors. We shall collect our own third and store it, and leave the springs to their natural courses. Captain Linskill will have an additional security, because at the present time it is possible that some dishonest person might abstract the flow down to the open gauges in the stream, one twice as wide as the other—some person might abstract the water passing down Captain Linskill's part of the stream, and divert it to that which is enjoyed by the company. When these works are constructed that access will be closed from that time, and the company will have no access to the stream except that which they gain from their reservoir and gathering-ground above. The reason why we must close that connexion is this—that our reservoir is placed at a height of 170 feet above the point at which we now take the water. It is about 600 feet above the sea. To enable us to enjoy additional pressure that will allow us to supply the high district of Liverton Lockhouse and some parts of Skelton, we require all the pressure that the reservoir can give, or it would not

be worth our while to draw the water from a lower point. We shall have no intake below our proposed new reservoir. I calculate that from that district of 912 acres we shall obtain an average of 509,000 gallons per day by storeage of the floods. This will be the case, simply from the natural flow of the streams supplemented by the catching of the floods. The soil of our gathering-ground is sand and stony, open to natural heather; above the site of the reservoir it is open moor. We propose to make a reservoir of 33 acres, to contain about 98 million gallons. That is the amplest size that it is usual to construct to an extent of 40 feet in depth at its deepest part. For the 912 acres it appears to me that no person below can be entitled to claim any compensation. We shall compensate the mills and those places which will be affected. We desire to provide for any prospect of increase which we may have during the next ten years. In order to save the water from the additional 532 acres, it will be necessary to raise the water of our reservoir 5 feet. That will give us 42 million additional gallons at least. Captain Linskill has no water right in the shape of a water power. He has only one side of the stream. I think it will be better for him to have the water at a moderate price rather than be at the whole expense of pumping it himself. At the present time the company only supply Saltburn, which is a watering-place, and the little village of Skelton, and a few houses at Brotten, but if they obtain this Act they will be entitled to supply Redcar, a much larger watering-place than Saltburn, and is at present dependent upon the most precarious source of supply from Lord Zetland's estate—springs which may be run dry by the iron-mining operations going on there at any moment. If we were called upon to supply Redcar, probably the supply would be doubled immediately. I have known cases in which provision was made for a quadrupled supply. For instance, in the case of Leeds we ourselves, when we applied for our late Act, were only using 5 million gallons a day; but we obtained from Parliament power to command a district capable of yielding 20 million gallons a day. Our evidence was that we were an increasing place, and that in 10 or 12 years we should require it. I think this is even a more extreme case of rapid increase than Leeds. Leeds is an ordinary manufacturing town, increasing at the rate of 2 per cent. per annum. In this district the gentlemen who have made careful estimates of it say that they see at once a probability of requiring in the next year or two a supply for 20,000 inhabitants.

Cross-examined by Mr. CALVERT: We have not got in our one-third the highest part of the collecting-ground. The summit is upwards of 900 feet. The rainfall is no doubt much greater upon the higher than the lower ground. We have no power, without an agreement, to make a reservoir. For purposes of this kind, one month's gauging taken in the month of March, when the springs are full, is much more favourable to Captain Linskill's view of the case than it is to that of the company.

Re-examined by Mr. LITTLER: I made a calculation of the water which went over Captain Linskill's and our gauge conjointly, and it varied from 196,000 gallons per day (the total of both) to 263,000 gallons per day. Captain Linskill is not injured because the nature of the country on which the rain falls in the whole of that gathering-ground is such as to conduct the rain water down to Captain Linskill's property, and to bring it out below the reservoir. The ground springs are no doubt supplied by the rainfall from above, but the water from the rainfall percolates directly through an open cullender-like stratum that lies above, and which water will never find its way into our conduit, which is merely a surface cut to take the water when there is more water gathered from the rain than the earth will swallow and send down to the springs.

Thomas John Bewick, Esq., examined by Mr. RODWELL.

I am a civil and mining engineer, and have examined the proposed plan of catching the water here for the supply of the Cleveland Water-Works. I coincide with Mr. Filliter as to the fact that although we take one-third of the gathering ground, a great deal of water will find its way into the springs below the reservoir so as not to interfere with the supply of Captain Linskill. I mean that from the formation of the ground and the strata the water will percolate through it, and discharge itself lower down. The surface of the district is composed principally of sandy soil, partly black sandy soil, but with occasional spots of yellow and darkish clay mixed with sand as well. I should have no hesitation in erecting a reservoir on the site proposed. I think the work is well devised, and I do not think that Captain Linskill will be damnified at all. The idea that he has upon the subject of the loss of water is without foundation. He will be in a better position, because he will have the advantage of having the water delivered at high pressure; he will have more than his proportion of the water that is available, and if the proposition of the company is carried out he will have it without incurring any expense whatever in erecting a pumping-engine or other works to get the water from the stream up to the site of the pit. I mean that there would be a greater proportion of water delivered below the reservoir conduit, taking six dry seasons. I quite agree with the figures given by Mr. Filliter. I think the supply will be more equalized, because the reservoir will naturally take the flood waters. It would certainly be no disadvantage to any proprietor below, because where those flood waters are going down they are no advantage to any one; in fact, I should consider them in clay banks like these a positive disadvantage.

Cross-examined by Mr. CALVERT: The company have taken the best part of the gathering-ground, considering all the circumstances of the case. I do not believe they have got any advantage by the gaugings. It is shown that they do not get any advantage except this—that they get the floods, and that is no disadvantage to Captain Linskill.

James Glaisher, Esq., examined by Mr. RODWELL.

I am a Fellow of the Royal Society, and superintend the meteorological department of the Greenwich Observatory. I have been engaged in pursuits of a kindred character for 40 years. I have in the course of my calling visited different districts for the purpose of ascertaining rain-gauges and the fall of rain. I am acquainted with the proposed gathering-ground of the Cleveland Company, and know the gaugings very well. Taking the area, as I am supplied with the figures, at 912 acres, at an average height of 750 feet, I calculate that the average fall of rain there will be 26·7 inches. From long experience, taking off one-sixth part so as to find the fall of rain in three consecutive driest years, reducing it by one-sixth, it would be 22·5. Then I apprehend that the evaporation and absorption there would only be from 13 to 14 inches, and taking it at 13·5 at the average, that would leave about 8·7 inches available; that is at a height of 750 feet. There would be 509,000 gallons per day, which would flow from that. Water will, of course, percolate through the upper surface, and it must go somewhere to the springs below. It depends very much upon the height.

Cross-examined by Mr. CALVERT: My calculations are founded upon an average of 750 feet. Supposing it was an average of 550 feet, the rainfall would be then 24·74. If we were at 500 feet, there would be 24·7; if it were 600, there would be 25·3; and if 700, 26·0, or very nearly to those points. Supposing it was 24·7, 7·10 would be the available water.

Re-examined by Mr. RODWELL: Each inch would produce 22,622 gallons, and if that was multiplied by 7, it would be about 159,000 gallons: 509,000 gallons a day would want the whole nine inches to produce it, but there are only 7 inches for the year, so that you have to divide it by 365, the daily fall. What I have given you is the 365th part of that. The calculation is made upon certain data as to the height of the land, which I arrived at from information furnished me by the engineer, and also by looking at the contour of the Ordnance map. It is an average of 750 feet in the average of the 912 acres, and 26·7 is the average fall, to be reduced by one-sixth part of the rainfall in the three driest consecutive years, and then again by the loss of water which we know to take place by evaporation and absorption.

The COMMITTEE: What is the highest rainfall in England?

Witness: In one month we were 39 inches at Seathwaite, in Cumberland, and that is 180 inches in the year.

The COMMITTEE: What is it at Dartmoor?

Witness: It would not be nearly so much—from 50 to 60 or 70 inches.

The COMMITTEE: Are not Lancashire and Derbyshire about the rainiest?

Witness: You get the backbone of England in Lancashire, and the air, charged with water coming from the Atlantic, meets with these cold hills, and catches their tops, and on the leeside of the hill you get the greatest fall of rain after the air is cooled down by the the top of the cold mountain. It does not fall immediately; it has to take time to get down to the temperature of the dew point below, so that upon the leeside of the hill you will have the greatest fall of rain all over the country.

This was the promoters case, and the following evidence was then tendered on behalf of Captain Linskill:—

William H. Bartholomew, Esq., examined by Mr. SHIELL.

I am a civil engineer, and well acquainted with water engineering. I am engineer to the Aire and Calder Navigation—one of the most important inland navigations in the country. There are a large number of mills on the stream, and we have constant occasion to consider the question of the necessary supply of water to the various works that are entitled to it, and of the compensation water which should be given to them. I am acquainted with the property of Captain Linskill, and was consulted by him when the Cleveland Company first applied to Parliament for an Act. It was then proposed to take a supply for Saltburn and Skelton from the stream which supplied the Little Moorsholm Estate. I found that the entire drainage to the junction of Captain Linskill's estate was about 2867 acres. The length of the stream was about six miles. The area of the catchment basin was about 12,800 acres—the entire catchment area of the Kilton Beck; that portion of the gathering-ground above Captain Linskill's estate is 2867 acres. The size of the petitioner's estate is about 260 acres, and the stream bounds it for a distance of 62 chains, or a little over three-quarters of a mile. The general elevation of the collecting-ground is about 800 feet above the sea. The rainfall at Whitby in 1865 was 22·63; in 1866, 28·30; in 1867, 25·02; in 1868, 25·90; in 1869, 23.83; and in 1870, 26·68. The average of the five years from 1864 to 1868 was 24·70. The available rainfall would be about 16·47, according to the old rule; and those rain-gauges I should explain are taken at a level of 150 or 160 feet above the level of the sea; but, inasmuch as this gathering-ground is about 800 feet high, you will have to add 3 per cent. for each 100 feet to the amounts which I have given. The usual amount of compensation allowed out of a rainfall of 16·47 inches would be 5·49 inches, and that brought out per day would give 266,432 gallons upon the rainfall; but that being at so low an elevation would not give the proper amount, there should be 15 or 16 per cent. added to that quantity. One inch of rainfall per acre would represent 3630 cubic feet. I consider the estimate of 5·49 inches too low, if anything, because the rain-gauges are placed at a low elevation, and the gathering-ground is so much above it—in the one case it being about 184 feet, and in the other 800 feet. The quantity of water which Captain Linskill is entitled to by way of compensation would be, in gallons, 346,361. Instead of this, it is proposed to give him 10,000 gallons per day, at the rate of 6d. per 1000 gallons. The company ought not to have one-third of the gathering-ground. The arrangement of the previous Act being that they should have one-third of the stream, they have appropriated the very best gathering-ground, where there is the greatest proportion of rainfall. Any calculations of water supply, based upon an average from the 24th of February to the 23rd of March, I think, would be sadly too short. I consider that a good water supply is necessary for the petitioner's estate under any circumstances. It contains valuable minerals, which are to be worked within a short time. There is a natural flow which would be suitable for the supply of the estate. Water would give a certain value to the estate as a residential place. In 1869 the promoters rested their case a good deal upon sanitary grounds, and Captain Linskill, I believe, said that he would not stand in the way of the health of the neighbourhood, and consented to give up one-third of his water supply without compensation. It was proved from the gaugings that the actual maximum flow of the stream was 7 million gallons, the average 2 million gallons, and the minimum 600,000 gallons; 75,000 gallons per diem was stated many times over as the quantity required then for the district, and the districts proposed to be supplied were Saltburn, Skelton, Upper and Lower Marske, Upleatham, Brotton, and Redcar. Clauses were then framed and approved by the committee for carrying into effect the arrangement. I was the engineer of the petitioner. Under the clause in the Act a plan was to be approved of between the two engineers, or an engineer to be appointed by the Board of Trade. The engineer of the water company prepared a plan for dividing the water, and after making an effort to buy up Captain Linskill's rights by a sum of money, his answer was, "I want the water, I do not want the money." Then the plan was prepared, and works were proposed that were of wood, and not of a durable character, and I objected to the plan, and requested that it should be amended. The plan was amended, and an effort made to try if they could not compensate Captain Linskill with money, but the same answer was returned again. Then after that the engineer sent an amended plan, reducing the size of the works, and another endeavour was made to see if some compensation could not be come to, and that also was declined. We wanted the works to be carried out. They were then carried out in accordance with the plans, which have been altered and settled, and which received the seal of the company and my own signature. On being called in to examine the works, and to pass them, there was an appearance of the dam having been blown, and dividing the weir, but on inquiring from Mr. Anderson I found that a pipe had been placed beneath the weir. The effect of that pipe was to abstract from the river a larger proportion than the one-third to which the company had a right. The company proposed to pay Captain Linskill £2 per week for the use of the water, to come to an end as soon as the plans were signed and agreed to. There was no bargain upon it. They worked under that agreement for a year and two months, or something like that time. Had the pipe been used for the purpose of utilizing the overwash, it would have defeated the operation of the lower gauge. If I had wished to take advantage of the overwash, I should have taken the pipe in at the top, and carried it on the ground around the weir—not beneath the work and underground. It is a very roundabout way if it should require repairing, being placed in the bed of the beck. That would not have enabled the company to take the water improperly, and would have secured to Captain Linskill his fair and proper supply as regulated by the clauses.

Cross-examined by Mr. RODWELL: I should say that the company did take water improperly, because Mr. Anderson told me that he had used it for the purpose of a filtering-bed. I do not pretend to know much about mining operations. Captain Linskill will be always compelled to look after the company to see that the water is not taken improperly; there will be very great difficulty in defining the districts, because the conduit will run down to him, and will enable them to take the water gradually from him in the same way that the pipe was put under the reservoir. I say let us have stream-gauges, where the quantity can be properly ascertained, and not simply deal with the gathering-ground, which cannot be absolutely ascertained, or not without great trouble. The company would take one-half of the best gathering-ground, and give him no compensation; they would do away with the ordinary rule. Instead of making a compensation reservoir, and giving the ordinary compensation flow, they cut him away from that entirely. It is a great residential injury to have the beck taken away. At present he does not use the water except for cattle and for general farm purposes, but the question of the opening of the minerals and the water that he may then require must be considered. I do not think

it would be cheaper for him to get his water at 6d. per 1000 gallons than to help himself to the stream in its present state. Captain Linskill would have a right to take away 60,000 gallons per day from the stream, and return it after using for steam-engines and boilers. It is possible that he might require 100-horse power engine to consume 60,000 gallons a day. I am speaking off-hand.

Captain *Wm. Linskill*, examined by Mr. CALVERT.

I am the proprietor of the estate of Little Moorsholm, and lord of the manor of Great Moorsholm. My estate at the former place extends to about 250 acres. My mansion was situated at Tynemouth, but as my estate there has become valuable for mineral purposes, I have been obliged to give up my residence there. I intend to build on my Little Moorsholm estate. I have a large iron-stone royalty in Great Moorsholm, and it is a great object for me to have a residence near. It is a beautiful country. The banks of the beck are 200 feet in height, and well wooded. My property depends upon the beck for a supply of water. It was formerly a very good salmon-fishing stream, but the weir has injured it considerably. If the stream is diminished it will depreciate the value of my estate as residential property very greatly. With respect to the pipe which has been alluded to, I threatened to put the whole matter into the hands of my solicitor, and then the company removed 90 feet of 12-inch metal pipe. I have let the minerals upon my estate, and a supply of water will be a very important consideration indeed. I consider that if the company are allowed to take the quantity of water proposed it will be very injurious to my estate. I am prepared to abide completely by the bargain which was made by the clauses of the Act of 1869.

Cross-examined by Mr. RODWELL: I am advised that I am entitled to compensation. I have only a limited use of the water, it is true. The land is admirably calculated for a private residence, being 500 feet above the level of the sea. My opposition is not entirely with reference to compensation, as I have refused compensation on various occasions. I do not wish to throw out the bill entirely, but I want to have a certain quantity of the stream preserved for myself, first, for residential purposes, and, secondly, to satisfy my mining lessees. My mineral engineer, Mr. Foster, is the first man in the north of England. I wish the bargain of 1869 to be honourably fulfilled. Mr. Foster considers that I ought to have reserved to me about 60,000 gallons a day, in order to suit the mining population which may be expected to settle there very shortly.

Re-examined by Mr. CALVERT: Mr. Wharton, the other riparian proprietor, is, I believe, to be compensated by the company.

Mr. CALVERT having addressed the committee on behalf of Captain Linskill, and Mr. RODWELL replied,

The CHAIRMAN said that the committee were prepared to pass the preamble of the bill, subject to the following conditions:—1. That the terms proposed by the company, substituting £500 for £300, and an unlimited supply of water for the limited supply first proposed, should be made obligatory, if Captain Linskill assented within a month. 2. That the reservoir be constructed within five years. 3. That, until the completion of the reservoir, the protective clauses of 1869 should remain in force. They wished to give Captain Linskill a month to make up his mind. If he did not assent within that time, the bill would go on, and the other clauses would remain untouched.

Legal Intelligence.

VICE-CHANCELLOR'S COURT.—WEDNESDAY, APRIL 26.
(*Before Vice-Chancellor* WICKENS.)

BARLOW *v.* BAILEY.

This is a nuisance case, more than usually interesting. The bill is filed to restrain the defendants, who carry on business as the Galen Chemical Company, near Wolverhampton, from continuing the manufacture of ammoniacal compounds and other chemicals on their premises, so as to cause a nuisance to the plaintiffs, who are the owners of the Bilston Flour Mills, and whose works are only separated from the defendants by the road running between their premises. The chemicals principally manufactured by the defendants are salts of ammonia, and they are produced from gas water, by a process in which large quantities of sulphuretted hydrogen and other gases are evolved, the odours produced being described by the plaintiffs witnesses as not unlike that of rotten eggs. To this simile several of the defendants objected strongly, insisting, in answer to the charge, that the smell was not like that of rotten eggs, but not otherwise answering the allegation. Independently of this, the case made by the plaintiffs was that, whenever the effluvium was carried in their direction it produced headache, sickness, nausea, and such general distress to the system that their workmen were prevented from continuing their work; but on this and other points the usual amount of contradictory evidence was brought forward on each side, nearly 30 witnesses appearing for the plaintiffs, and almost as many for the defendants. Several attempts had been made by the defendants to put a stop to the nuisance, and it was stated at the bar that arrangements were now all but completed, by which the nuisance will be effectually obviated.

Mr. GROVE, Q.C. (specially retained), Mr. DICKINSON, Q.C., and Mr. CRACKNALL appeared for the plaintiffs; Mr. GREENE, Q.C., and Mr. NORTH for the defendants.

This afternoon, at the conclusion of the arguments, which lasted nearly the whole of the three previous days,

The VICE-CHANCELLOR reviewed the evidence, and said that he considered it had been proved that sulphuretted hydrogen gas was emitted from the defendants works in such quantities as to constitute a nuisance, and that, notwithstanding the efforts which had been made to obviate it, it was at the time the bill was filed a continuing nuisance of a character which entitled the plaintiffs to an injunction. An attempt had been made on the other side to prove that the nuisance complained of had to some extent arisen from other sources; and it was shown that, in particular instances, it had actually been traced to causes independent of the defendants works. But, on the whole case, he considered that the plaintiffs had sufficiently discharged the onus of proof which lay upon them, and that they were entitled to the injunction they asked. From the evidence it appeared that, by the use of proper means and care, the works could be carried on without causing the nuisance, and the injunction would, therefore, operate as a guarantee to the plaintiffs that those means would be adopted, and that care would be exercised.

COURT OF EXCHEQUER.—SATURDAY, APRIL 29.
(*Sittings in Banco, before the* LORD CHIEF BARON *and Barons* CHANNELL *and* PIGOTT.)

THE BIRMINGHAM AND STAFFORDSHIRE GAS AND LIGHT COMPANY *v.* RATCLIFF.

This was an action brought for goods sold and delivered, the claim being to recover the price of 7,129,300 cubic feet of gas, the amount for which was £861, less £192, leaving a balance due of £668. The defendant paid £150 into court, and pleaded that he was not liable for more than that sum, and this was the issue to be tried in the case. It was wholly and entirely a matter of account.

Mr. MANISTY, Q.C., showed cause against a rule obtained by Sir J. B. Karslake, Q.C. (with whom was Mr. Wills), calling upon the defendant (Mr. Howard T. Ratcliff) to show cause why the order of Mr. Baron Cleasby, dated June 29 last, should not be rescinded; the order being for referring the matter to what was known as a compulsory arbitration, under the Common Law Procedure Act. Application was made in November last for the rule, and it was allowed to stand over until January 24, when on the 31st of the same month it was renewed, and the court granted a rule *nisi*. The affidavits upon which the rule had been obtained set out a variety of circumstances denied by the defendant. The allegation was, that the defendant had permitted some pipes to supply gas to his burners in his place of business, which was a very large manufactory in the borough of Birmingham, without that gas passing through the meter, so that he defrauded the plaintiffs, whose affidavits showed that the question which they wished tried was the question of fraud, which the learned counsel contended had nothing to do with the matter. His client admitted that discoveries had been made, which resulted in showing that large quantities of gas had found their way into his premises unknown to him. The affidavits filed by the plaintiffs submitted that the course of procedure in this case should be by way of fraud against the defendant, it being well known that gas companies were exposed to depredations and defraudings of this kind, which it was very difficult to bring clearly to light. They wished that the case should be tried before a special jury of the county of Warwick.

The LORD CHIEF BARON wished to know if any discovery had been made as to the mode in which this fraud was alleged to have been effected?

Mr. MANISTY, Q.C., said not. But he admitted that he (the defendant) was liable for all the gas that passed through the meter into his premises. Elaborate calculations had been made by scientific experts, and they considered that £150 would cover the whole of the charges for which he was liable to the company. On the other hand, the plaintiffs say that they too had made equally elaborate calculations, the result of which was that defendant was indebted to them in a sum of upwards of £500. This was really the question in dispute between the parties.

The LORD CHIEF BARON: That may depend on a nice question of machinery, for what we know. Do the affidavits say or suggest anything as to the mode by which the defendant obtained a considerable quantity of gas which never passed through the meter?

Mr. MANISTY said not, but it was no doubt ascertained, because the streets were taken up, and it was found that the pipes were not connected with the meter that supplied the gas. There was no difficulty as to that, but there was great difficulty in making the calculations, which would extend over five years—from Oct. 9, 1865, to May 9, 1870—during which period, day and night, defendant was burning gas. His client denied that he knew of these pipes, whereas the other side would make him out as almost guilty of absolute larceny. As he said before, nobody could tell how the pipes came to be laid down, and how they came to be disconnected with the meter; but he might state that since 1865 two companies had supplied the defendants with gas, and to these was entrusted the duty of looking after the pipes, meters, &c., which were never examined by the defendant. He admitted that undoubtedly in 1870 a communication was made, not to this company (the Birmingham and Staffordshire), but to another company (the Birmingham Gaslight Company), that gas was used in this brass factory which did not pass through their meter; and on its receipt they (the defendants) communicated with the plaintiffs, telling them they had better come and see to the matter. Two courses were open to the plaintiffs. If they thought that the defendant had used their gas improperly, it was optional with them to prefer an indictment against him; or they could summon his client before the magistrates, and heavy penalties might be recovered. If it were proved that he had fraudulently used this gas with a guilty knowledge, he could be indicted for larceny. Mr. Manisty then read the affidavits of Mr. Walsh, the secretary of the company, and of an attorney's clerk.

The LORD CHIEF BARON thought that the simple question at issue was as to the quantity of gas consumed during the five years, and whether there was a guilty knowledge on the part of the defendant as to this undue quantity being so consumed.

Mr. MANISTY, Q.C., said that his client challenged the company to bring a charge of fraud, and have the case tried in open court, before a public jury, and they refused; as also a challenge to ascertain the number of cubic feet of gas which had been improperly consumed. This remedy was open to them, or they could take out a summons before justices, for penalties, but neither of these alternatives was resorted to. They adopted the more unmanly and unfair course of throwing out these insinuations *in perpetuam*, and keeping an unfounded charge hanging over an honest and respectable man in so disreputable a manner. It was really too bad. The learned counsel then read the affidavit of the defendant, which stated that he carried on a brass factory in Birmingham which employed 150 men, and was supplied by two gas companies—the Birmingham Gaslight Company, and the present plaintiffs, the Birmingham and Staffordshire Gaslight Company. He indignantly denied the truth of insinuations contained in certain paragraphs of the plaintiffs affidavit, and which he alleged was made for the purposes of insult and annoyance. On the 23rd of January, 1870, the Birmingham Gaslight Company sent him the following letter, which they had received from the writer, a man named Isaac Blake, who (counsel believed) had formerly been in their service. The letter was dated Jan. 1, 1870. "I beg to lay before you the following information:—A certain manufacturer in Birmingham is, or has been till within a few weeks, burning gas for about four years without being registered by the meter. I beg to say his name is Howard T. Ratcliff, Church Street, Summer Lane, trading as Joseph Ratcliff and Sons. He (Mr. Ratcliff) said, on one occasion, when a considerable quantity of gas was actually being wasted by his workpeople, he did not care, as it cost him nothing. I have several witnesses who can corroborate this, and amongst them men who worked under me at the blow-pipe. I put my name, but I hope you will hold me harmless in this matter." He (Mr. Ratcliff) took the letter at once to his solicitor, Mr. Williams, who showed him the following letter [From Isaac Blake to the defendant]:—"Jan. 4, 1870,—I beg to apologize for a statement I put forth regarding your conduct, which I now believe to be incorrect." Mr. Ratcliff denied, as stated by the other side, that he purposely remained out of the way, the fact being that, for the purposes of his business, he had to travel on the Continent for six months in the year. He did not believe that a Nisi Prius Court would be the proper tribunal in which to try this case; but at the same time he wished to court the fullest and most searching inquiry into his conduct. The plaintiffs had their remedy under the Gas Clauses Act, but they had neglected to avail themselves of it. The learned counsel then read the affidavit of Mr. Clift, gas engineer and proprietor of gas-works, who said that this was a question of account, which could only be properly tried before a competent arbitrator, and not in a county Assize Court.

Mr. MELLOR followed on the same side, contending that from the complicated nature of the accounts, and the elaborate calculation which it would be necessary to go into to fully understand the matter in dispute, it was not a question for a jury.

Sir JOHN B. KARSLAKE, Q.C. (with him Mr. Field, Q.C., and Mr. Wills) supported the rule which he had obtained. He was surprised at the allegation of his learned friend on the other side that the charge of fraud was now made for the first time. He did not know what the former proceedings had been, but his friend, Mr. Wills, informed him that when the matter was before Mr. Baron Cleasby the allegation made by the counsel for the plaintiff amounted to a charge of fraud. He said it was futile to talk of indicting the defendant, for then the mouth of the chief actor in the transaction would be shut, and they could really prove nothing. It was not necessary that the plaintiffs should prove that there was an abstraction of gas with the knowledge of the defendant. A jury was the only competent tribunal to deal with the case, and decide on

the fact of there being certain service-pipes from which gas was used in a fraudulent and improper manner. The learned counsel commented on the removal by the defendant of certain caps which had been placed in these premises in connexion with the gas supply by the company.

The LORD CHIEF BARON said the real gravamen of the case lay in this: Did the defendant commit these things knowingly and wilfully, or were they done with his knowledge? His lordship corrected the learned counsel for using the word fraud, as a charge of fraud had really not been substantiated. A better word might, perhaps, be imperfect knowledge.

Sir JOHN KARSLAKE proceeded to speak of what he called the very suspicious conduct of the defendant, who, by scientific evidence, and the facts evolved in the case, he would prove to the satisfaction of a jury had knowledge of this fraud on the gas company. It would, no doubt, be sufficient to bring home a charge of absolute larceny, but there might be something short of that which a competent jury could determine. In the interest of the defendant himself and of the plaintiffs (and it was a well-known fact that frauds were constantly being committed upon gas companies which they had no means of ascertaining, as in the present case), he asked the court to make absolute the rule for sending down this case to be tried at Warwick.

Mr. FIELD, Q.C., and Mr. ALFRED WILLS followed on the same side, and at the termination of the learned counsel's arguments,

The LORD CHIEF BARON, after consulting with the other judges, said that this was so important a case the court would take time to consider before giving its judgment.

MONDAY, MAY 1.

The court gave judgment to-day in this case.

Baron CHANNELL said he was of opinion that the learned judge had properly exercised the jurisdiction given him by the Act, in referring the matter compulsorily to arbitration, and that the order granted for that purpose ought not to be disturbed.

Baron PIGOTT was of the same opinion.

The LORD CHIEF BARON said that the case involved the question whether the defendant was or was not privy to the gas being consumed clandestinely; it was not entirely a matter of account, and should, therefore, be submitted to a jury. He thought the learned judge (Baron Cleasby) had no power to make the order under the circumstances; but, as Barons Channell and Pigott entertained a different opinion, the rule would have to be discharged.

Rule discharged accordingly.

WHITECHAPEL COUNTY COURT.—FRIDAY, MAY 5.

(Before Sir WALTER B. RIDDELL, *Bart., and a Jury.)*

HARRIS *v.* THE COMMERCIAL GAS COMPANY.

Mr. COLLINS (barrister) appeared for the plaintiff, and Mr. BESLEY (barrister) for the defendants.

This was an action brought to recover the sum of £5 4s. 10d. for money received from the plaintiff by the defendants on the 25th day of March, 1871, under threat of cutting off the supply of gas to his premises, such sum not being due from him to them, but paid to avoid such threat being carried into execution.

Mr. COLLINS, in opening the case, said the question involved in it was one of considerable importance, not only to Mr. Harris, the plaintiff, but to every gas consumer in that parish and other places. The amount in dispute was only £5 4s. 10d.—a sum which, probably, the plaintiff cared very little about, his desire being to have it decided whether the company were acting fairly to him in charging, as he believed, 100 per cent. more for the gas he had consumed than was due to them. The plaintiff was a dentist in the Mile End Road, and for many years had been supplied with gas by the defendant company. As was usually the case, the company sent in their accounts quarterly, and this action related to the supply of gas for the quarter between September and December, or, perhaps, he might say up to the 27th of January in the present year. During that time the plaintiff had on several occasions complained that he could not obtain a sufficient quantity of gas for his purpose, and once or twice the company sent and changed his meter. He still complained of an insufficient supply, and the company cleared out his pipes, and appeared to have done all they could, although without success, to remedy the evil. To the great astonishment of the plaintiff, notwithstanding the deficiency of supply, the company sent him in a bill at the end of the quarter for no less than £13 17s. 11d., which was about double the amount he had paid for the corresponding quarter of previous years. He asked for an explanation, but the company had none to give him, and at length they threatened him that if the amount claimed was not paid in 24 hours they would cut off the supply of gas to his premises. The plaintiff, in the way of his profession, was obliged to have the gas—he could not afford to be left in darkness; he, therefore, paid the amount demanded, under protest, and now sought to recover the sum of £5 4s. 10d., which he believed he could prove was the overcharge made upon him. The plaintiff had carefully preserved his accounts for the last six or seven years, and he would be able to show that during the quarter ending at Christmas, 1870, he burnt less gas than in the corresponding period of the previous year. The amount paid by him for gas supplied in the quarter ending Christmas, 1869, was £6 8s. 4d., and if to that sum were added a third, or £2 2s. 9d., to the account now in dispute, for the consumption during the month of January this year, it gave a total of £8 11s. 1d. Deducting this £8 11s. 1d. from the sum actually charged by the company, there was a balance of £5 6s. 10d., which the plaintiff said was an overcharge which should be returned to him, though he only claimed in this action £5 4s. 10d. That the defendants had overcharged the plaintiff might be tested in another way. During the month of October last the meter at the plaintiff's house was taken away, and a new one supplied, which only remained there two days. The consumption, as shown by this second meter, was 700 cubic feet, or 350 cubic feet for each day it was in use; but according to the account demanded of the plaintiff, the consumption for every day during the period under discussion was 700 cubic feet. It was evident the company had made a mistake, although they would not admit it, and the plaintiff now asked the jury to give him back the amount he had been overcharged, and which he had paid under protest.

Mr. *Alfred Ellis Harris*, examined by Mr. COLLINS.

I am the plaintiff, and carry on the profession of a dentist at 176, Mile End Road. For many years I have been supplied with gas by the Commercial Company. I produce receipts for the gas-rent paid for the Christmas quarters during the last six years. In 1863 the quarter's rent was £6 8s. 6d.; in 1865 it was £5 6s. 4d. I have lost the receipt for 1864. In 1866 it was £6 8s. 9d., in 1867 it was £7 16s. 9d.; in 1868 it was £5 12s. 9d., and in 1869 it was £6 16s. 9d. The total of these sums is £38 9s. Deducting from the first a portion of the Michaelmas quarter included, the total is £36 2s. 8d., making an average of £6 odd for each quarter. In September of last year I had occasion to make complaint that I could not get a sufficient supply of gas for my work. I have had apparatus (in which I use gas) in use for the last ten years successfully, and all at once I found that I could not get a sufficient supply. I sent to the company, and Mr. Buckingham, their inspector, came to my house. He went into the workshop, and I showed him the apparatus. He told me my fittings were bad, but I, being a mechanic, told him I knew it was not so, and that it was the naphthaline in their pipes. He sent a machine to clear out the pipes afterwards. During the quarter ending Christmas last, I burnt less gas, certainly by one-half, than in the corresponding quarter of the previous year.

Mr. BESLEY said he must now take a legal objection—viz., that it was not competent for the plaintiff to give evidence of this kind as to the supply of gas, as that matter was regulated by Act of Parliament. In the preamble of the Sales of Gas Act, 1859, it was recited that it is expedient that the measurement used in sales of gas for lighting, heating, and other purposes should be hereafter regulated by one uniform standard, and that all meters should be stamped as thereinafter provided. It then went on to say that the term "meter" could include every kind of machine used for measuring gas; and by the second clause it was provided that after the passing of the Act the only legal standard or unit of measure for the sale of gas by meter should be the cubic foot, and it prohibited the making of any contract for the supply of gas upon another basis. By the 10th section it was provided that no meter duly stamped under the authority of the Act should be liable to be restamped, although used in another place than where it had been stamped, but should be considered a legal meter throughout the United Kingdom, unless found to be incorrect within the meaning of the Act. By the 12th section it was enacted that no meter should be stamped if more than 2 per cent. incorrect in favour of the buyer, or 3 per cent. in favour of the seller, and to be stamped if erroneous to no greater extent. By the 16th section permission was given to consumers to purchase and use for the measurement of the gas supplied to them any duly stamped meter; and the 17th section provided that after ten years from the passing of the Act all meters must be stamped. His honour would, therefore, see that there had been the strongest possible legislation on the subject. The consumer might use his own meter, or if he had one supplied by the company he might have it tested at any time, and if found incorrect a penalty would be inflicted on the company. Then by the Metropolis Gas Act, 1860, the provisions of which extended to the Commercial Company, it was provided that the gas company must provide meters if required, and they were under penalties if found guilty of any breach of the Act.

Mr. COLLINS objected to his learned friend interrupting at this stage of the proceedings.

Mr. BESLEY contended that he was in order in doing so, because evidence was being given respecting the supply of gas to the plaintiff, which he was precluded from doing by the Acts which he had quoted. By the first of these Acts gas-meter examiners were appointed to test the meters in use; and, in fact, there was legislation upon every detail of contracts between gas companies and their customers. He submitted, therefore, that his friend was only entitled to show, if he could, either that the meter through which the plaintiff's gas was furnished had been incorrectly read by the company's servants, or that the meter itself was not correct according to the Sale of Gas Act. It was not competent to him to give evidence such as had been opened to the jury, upon some speculations of a consumer that he had not had as much gas as he was charged for. It might so happen that the meter in use up to 1870 did not register all the gas consumed by him.

The JUDGE said the question was whether the plaintiff burnt more or less gas in the Christmas quarter of 1870 than he had done before. He did not think there was any objection to that, as a general question.

Examination continued: I did not burn so much. I had exactly the same number of burners that I had the year previously, when I was only charged £6 16s. 9d.

The JUDGE: You need not press this much, because the jury have had experience in these matters.

Examination resumed: On the 27th of October last a fresh meter was put up at my house by the company, and that meter was taken away on the 29th. For the two days it was there it registered 350 feet of gas consumed per day. The meter that was there previously had been up some years. For the gas consumed between the 10th and 17th of October, as registered by that meter, the company charge me £1 10s. On the 29th of October another meter was put up by the company, which is the one in dispute. It was examined on the 30th of January last by Mr. Airey, the inspector of meters, and rejected by him as being 4·38 per cent. too fast. It was taken away from my house on the 27th of that month. The company charge me for the time that it was up 64,200 cubic feet, and they deduct 2900 feet, which they say is 4½ per cent. for the meter being too fast, leaving the net amount charged 61,300 feet, amounting to £12 5s. 2d., and what they call "arrears," making the full sum £13 17s. 11d. I sent word to the company there must be a mistake, as quite half the time I had been without gas. I had to burn candles in my private apartments. I afterwards received a notice from the company that if the amount was not paid in 24 hours the gas would be cut off. That was on the 24th of March. I paid the money next day by a cheque, on the back of which I wrote that the money was paid under protest. There are 94 days included in the period charged in the bill, and allowing for a consumption of 350 feet a day, it would amount to 32,900 feet, but they charge me for 64,200.

Mr. BESLEY: That is supposing every day's consumption were alike.

Cross-examined by Mr. BESLEY: The meter that was up for two days last October stopped the first day I had it, and it was taken away because no gas would pass through it.

Mr. BESLEY: Then you only burnt gas one day?

Witness: We did not burn gas all that day—for only part of the day.

Mr. BESLEY: You remember the new meter coming on the 25th of October. Do you mean to say you consumed no gas through that meter?

Witness: I did not, to the best of my recollection; but I had my own business to attend to, and not expecting this sort of thing to take place, I did not take particular notice of it.

Mr. BESLEY: You want those five gentlemen to believe that the new meter put up on the 25th of October passed no gas at all?

Witness: Yes.

Mr. BESLEY: Very good. I take that answer.

The JUDGE: On what day was the new meter which did not pass any gas at all taken away?

Mr. BESLEY: It was put in on the 25th, and went away on the 27th. (To witness:) You do not pretend that it was there more than two days?

Witness: It was put up about eleven or twelve o'clock in the morning, and taken away the same evening.

Mr. BESLEY: Will you undertake positively to swear that the meter was not there for two days?

Witness: I state this to the best of my recollection.

The question was repeated several times, but no more definite answer could be obtained.

By Mr. BESLEY: I did not go near the meter at all. It was in the coal cellar, and I am rather too stout to get in there. I did not see the meter put in, nor did I see it taken away. There was another meter brought the same day this one was removed, and it was there till the 27th of January last. I was applied to several times for payment of the account before the gas was threatened to be cut off. I offered to pay £13, if the company would take off the 17s. 11d., but that was without prejudice, to obtain a settlement.

A JURYMAN: Hear, hear.

Mr. BESLEY: I trust your honour will take notice of the fact that a juryman says, "Hear, hear." It is a curious way of trying a case.

Mr. *Edward Wilmot*, examined by Mr. COLLINS.

I am assistant to the plaintiff. I have complained to the company's officers that we could not get sufficient gas for our work. They came about it several times, and made it better for a short time, but it was soon down again.

Cross-examined by Mr. BESLEY: Our work is vulcanizing and plate work. That is done with the heat from gas. For the metal work we use the blow-pipe, but the vulcanized work is by a steady heat from the burner. We could not get enough gas for the vulcanized work. The business is that of artificial teeth manufacture. The extent of the use of the blow-pipe depends upon the

quantity of business done. The plaintiff's business has increased very much in the last five years. Our busiest time is in the Christmas quarter. I remember a new meter being brought last October, but I do not remember whether it was there for two days or not.

Re-examined by Mr. COLLINS: Mr. Harris has been using the plow-pipe for years.

Mr. *Henry Airey*, examined by Mr. COLLINS.

I am an inspector of meters. On the 27th of January last a meter, No. 143,379, was brought to me to be tested. It was tested by me on the 30th, and found to be 4·38 per cent. too fast. Meters are liable to get wrong. If they are getting fast they have a tendency to get faster, and if they are getting slow they have a tendency to get slower.

The JUDGE: If you found a meter was 4·38 too fast at one time, it never, I suppose, would have been faster than that.

Witness: I presume not.

Mr. COLLINS: But can you say whether that is so.

Witness: I can only tell by testing, but as a general rule I should say not.

Cross-examined by Mr. BESLEY: This meter was perfectly correct when stamped by me on the 21st of February, 1870. It was then a new meter, and the index was at zero. I certified it as correct, and put my stamp upon it.

Mr. BESLEY: I see that when a meter is 3 per cent. in favour of the consumer, and 2 per cent. against him, you may certify and stamp it.

Witness: The Act says that within that range the meter shall be considered correct.

The JUDGE: Did you reject this meter when brought to you in January last?

Witness: I rejected it as stated in my certificate.

Mr. BESLEY: It does not follow that though it was 4·38 fast in January, 1871, it was fast from the 27th of October, when put up.

Witness: I cannot say how long it was getting fast.

Mr. BESLEY: But you would not believe it was 4·38 fast all that time?

Witness: Certainly not.

Mr. BESLEY: Then if we make an allowance of that amount to the consumer for the whole time——

Witness: That is more than I should allow as an arbitrator.

Mr. BESLEY: The company have allowed the full 4·38 per cent. all the time since the meter was put up.

Witness: I am not aware what allowance they have made.

Mr. BESLEY: That is more than you would have allowed as an arbitrator?

Witness: Yes.

Mr. BESLEY: There was nothing wrong about the meter. It was a good one when you first examined it.

Witness: Yes; or it would not have received my certificate.

Mr. BESLEY: Now, this other meter, No. 138,961. Did you make a report on the 30th of March with regard to that meter?

Witness: I did.

Mr. COLLINS: Show what this meter is.

Mr. BESLEY: I shall show that it is the meter which marked 700 cubic feet and then stopped.

Cross-examination continued: When I examined it the index was then standing at 700. I tested it, and reported upon it.

The following report was handed in, and witness was examined upon it:—

"*Metropolitan Board of Works Meter Inspector's Office,*
"*White Lion Street, Shoreditch, N.E.,*
"*March* 30, 1871.

"Sir,—I beg to report as follows upon a 10-light dry meter, No. 138,961, Gas-Meter Company makers, index 700, when brought here to be tested on the 29th inst., with a statement that it would not pass gas, after having passed 700 feet, as shown by the registration on the index:—

"The meter was placed upon the test-table in the presence of Mr. Buckingham, your inspector, by my assistant, and 10 feet was passed through at ·5 pressure, the meter passing 60 feet per hour, its normal capacity, the registration being 1 per cent. fast.

"A second test was then attempted of 10 feet, but when 8 feet had passed through the meter, as shown by the standard gasholder, the meter suddenly stopped its action, and the lights went out, thereby proving that, from some cause or other, the meter was defective; the pressure was then increased to 10/10ths, but without any effect upon the meter, and then your inspector left.

"I afterwards applied a pressure of 12/10ths, but without any result; but upon a further increase of pressure to 14/10ths, a sudden click was heard to proceed from the meter, which then again began to pass gas.

"Two 10-feet tests at ·5 pressure were again made, and the meter was found to register perfectly correct. The meter was again started at five p.m. on the 29th inst., and a continuous flow of gas passed through until ten a.m. this morning, the index showing that 1400 feet had passed through the meter without the lights being affected.

"I then again made a standard test of the registration of the meter, and found it correct. The top of the meter was then taken off by the foreman of the Gas-Meter Company, in the presence of myself and Mr. Buckingham, your inspector, to ascertain the cause of the stoppage, when it was found to arise from some of the wheels being too much in gear, and hence at times, and at certain points, they bind together and stop the action of the measuring-chambers, thus preventing the passage of any gas through the meter, and it requires 14/10ths pressure to overcome the resistance. The stoppage might occur almost the day the meter was fixed, or it, perhaps, would be several days before it stopped, being dependent upon certain points of the wheel-work.
—I remain, &c., (Signed) "HENRY AIREY, Inspector.
"R. Jones, Esq."

Cross-examination continued: It is impossible that this meter could have registered 700 feet, unless that quantity of gas had passed through it. It would not pass any gas through at all when it had become affected in the way I have described, so that a customer could not be charged for gas beyond that quantity. Consumers may have their meters tested at any time during office hours. The fee for testing varies with the size of the meter. The charge for a meter of this size—*i. e.*, 10 lights—is 1s. We sometimes test meters, which are too large to be removed, on the consumer's premises. The fee in that case is double the ordinary fee, and the expense of conveying the apparatus for the purpose. The amount would depend upon the distance; but it is not a large sum. We have power under the Act of Parliament to order the removal of a meter if we see it necessary. No meter can now be fixed unless it has been tested, and bears the official stamp certifying its correctness. Meters, whether wet or dry, are equally correct when they leave my hands.

Mr. BESLEY: Do you remember what the register of the meter No. 143,379 was when you saw it?

Witness: 64,200.

Mr. BESLEY: That showed (I will prove when it was at zero), that 64,200 cubic feet of gas had passed through, less the 4·38 per cent. that the meter was fast?

Witness: Yes.

Mr. BESLEY: And 4·38 per cent. upon the whole sum would amount to 11s. 9d.

Witness: That I have not calculated.

Re-examined by Mr. COLLINS: I examined the meter, which went "click" two months after it was taken away.

Mr. COLLINS said that was his case.

Mr. BESLEY submitted that there was no case to go to the jury, because by the Act of Parliament the meter put upon the consumer's premises was the instrument by which the dealings between him and the company were to be determined. The consumer was protected by the power he had to have the meter tested at any time. To go beyond that, and take the consumption for any corresponding period of another year, would be to admit evidence of a very vague character, because the jury could know nothing of what additional gas had been used during the period in dispute by the blow-pipe in the way of business, or what further consumption might have been necessitated by a greater number of foggy days. He submitted that there was no pretence for saying that the company had charged or the plaintiff paid any money beyond what the Act of Parliament allowed. He had paid for his consumption according to law, and he could not recover it.

Mr. COLLINS said it was for the defendants to prove the amount of gas which had been consumed. If they disputed the plaintiff's claim, they must show what quantity of gas did pass through the meter.

The JUDGE: My opinion is that there is no case at all to go to the jury. There is not the slightest evidence before me of any excess of charge.

Mr. COLLINS: With very great deference I have proved that double the quantity of gas has been charged for than was consumed in the corresponding period of previous years; and by the plaintiff's evidence I show that a smaller quantity was used. I have shown, too, that during two days the meter registered only 350 feet of gas per day. Surely it is a question for the jury whether the plaintiff is right or wrong in the matter. Does your honour say that there is not a scintilla of evidence to go the jury?

The JUDGE: I am of opinion that there is no case to go the jury. There must be a nonsuit. (Turning to the jury-box, his honour said:) Never was such a thing known before in this court as for a jury to say, "Hear, hear," while the evidence is proceeding.

The plaintiff was accordingly nonsuited.

Miscellaneous News.

CONTINENTAL UNION GAS COMPANY, LIMITED.

The Half-Yearly General Meeting of the Shareholders of this Company was held at the City Terminus Hotel, Cannon Street, London, on Tuesday, April 25—LEWIS CUBITT, Esq., in the chair.

The SECRETARY (Mr. R. J. Fennessy) read the advertisement convening the meeting, and the following report of the directors:—

Following the custom of the past few years, your directors have called you together to-day to submit a report upon the working for the half year ending Dec. 31, 1870. The report presented at the general meeting in October last informed you of the destruction wrought upon the gas-works at Strasburg by the bombardment, and also of the vigorous measures then being taken by the board to repair the damage. The result of the energy then brought into action was that with the two gasholders (of which one was an old one repaired, and the other entirely new), and with re-set benches, the lighting was resumed on Christmas-day. The increase in the consumption that has taken place every day since then has been far in excess of the board's expectations, and there can be but little doubt that during the ensuing season this important station will again approach, if not exceed, its former satisfactory results. Two other large telescopic gasholders are also being erected to replace those destroyed. The works at Rueil, near Paris, did not sustain any damage whatever by the bombardment of Paris, in so far as concerns the buildings and plant, but the lighting had to be suspended on the 20th of September last, and was not resumed until the 13th inst.; the delay was caused by our stock of coal having been forcibly purchased by the Paris authorities during the siege, and also by the disturbed state of the neighbourhood during the past few weeks. You will be prepared to learn that the recent war has not been without its injurious effects upon the results produced by the company's stations in France; Strasburg and Rueil have experienced a total loss of revenue for several months, but the other towns have not suffered, except from the universal stagnation in trade, consequent upon the terrible condition of the country. It is, however, with considerable satisfaction that your directors are able to state that the progress made by the Italian stations has been most encouraging; also that the workings generally since the commencement of the current year have been more cheering than during the half year now under review.

Your directors are continuing the outlay where necessary to put the stations in the most efficient working order. After careful consideration of the working for the past half year, the board have come to the decision to declare on this occasion an interim dividend for the six months ending December 31, 1870, at the rate of 6 per cent. per annum on the ordinary shares, free of income-tax. This dividend, together with that on the preference shares, will be payable on Thursday, the 4th of May. If the results of the current six months be as satisfactory as the directors have reason to hope, the board will be disappointed if, at the annual meeting in October, a higher rate of dividend be not then declared.

The CHAIRMAN: Gentlemen, this being our interim meeting, I have not a great deal to say to you; the directors have not a very voluminous report to present, nor have they any accounts to submit for your inspection. Unfortunately, in the brief statement we lay before you there are two features very unsatisfactory to the board, and which we wish we could make pleasanter to you. But, gentlemen, we offer you an honest and straightforward dividend, and we do so with the hope and expectation that it may never again be at so small a rate per cent. The position of affairs in France when I addressed you in October last was generally of a most painful character, and I then remarked that the state of things there was seriously affecting the working of our stations in various towns and cities, and diminishing the profits we ought to be making. I regret to say they have continued like that, and, unfortunately, in France at the present time there is no peace to shed her blessings around, and give us hope that trade may revive. No doubt it will do so when peace again prevails, but as yet it is difficult to see when that happy period will arrive. The stations belonging to this company which have chiefly suffered during the disturbed state of affairs are Strasburg, Montargis, and Rueil. The works at Montargis have not been injured at all; but the diminished trade there is greater than on the average of the other stations, except Strasburg and Rueil. The latter is nearer to Paris—close under Fort Valérien—and we are now lighting it again. We have sent in a fresh supply of coal, and expect a great spurt of business. At Strasburg we have put up two gasholders. We had four just previous to the commencement of the war; the fourth was only a recent erection, and we had not derived much benefit from it. From the progress which the lighting has made since the city has been in the hands of the Germans we find that we cannot give a sufficient supply of gas with the two gasholders we have, and we are now restoring the two which we had just before the war. We expect they will be ready in the course of three or four months, when we shall be in a position to meet the demands of the revived commercial activity, and if we want more storeage accommodation, why so much the better. The dividend which on the present occasion we offer you is, as I said before, small, compared with what we could wish to give you, but this arises from circumstances over which we have no control. We hope when we meet you again we shall be able to say it was but an interim dividend, and now we can do something better. I move the adoption of the report, and shall be happy to answer any question you may desire to put to me.

Mr. FAWCETT seconded the motion, which was put, and carried with acclamation.

The CHAIRMAN: Gentlemen, I think this concludes the business for which we have convened you to-day.

A SHAREHOLDER: We ought not to part without offering to the chairman and directors a vote of thanks. They have worked well for us, and the statement which they have laid before us to-day far exceeds my anticipations, considering the circumstances through which they have passed during the last six

months. I therefore beg to propose that the cordial thanks of the meeting be presented to the directors for their attention to the affairs of the company.

Mr. STOKES: I have much pleasure in seconding the motion. I am sure we must all be satisfied with the dividend offered to us under the circumstances.

The motion was put, and carried unanimously.

The CHAIRMAN: Gentlemen, we are much obliged to you for this vote. I can only say, "A word spoken in season how good it is." We are anxious to do the best we can at all times for the company. We partake of the advantages as well as yourselves, and we, like you, are the losers when there is any diminution in the profits. We shall continue our best exertions, and we hope next time we meet you to lay before you better results.

SINGAPORE GAS COMPANY, LIMITED.

The Annual Ordinary General Meeting of this Company was held at the London Tavern, on Tuesday, April 25—WM. HENRY LE FEUVRE, Esq., in the chair.

The CHAIRMAN, on taking his place, said: Gentlemen, before I call upon the secretary to read the advertisement convening the meeting, I have to claim your indulgence while I explain the reason why I occupy the chair to-day. I am sure you will be sorry to hear that our worthy and esteemed friend, Mr. H. P. Stephenson, who should fill this post, is laid aside by illness. He attended our board last Tuesday; in the evening he was taken unwell, and has since been seriously indisposed. I saw him yesterday afternoon, and though he is still confined to his bed, I am glad to tell you the doctor holds out hope that within the next few days he will be restored to health again. In his absence, the presidency of this meeting would have fallen upon our deputy-chairman, but, as our report informs you, he has just been removed by death. We deeply regret his loss. He was a gentleman who held a considerable pecuniary interest in the company, and had been a director from its formation. He was a constant attendant at the board, and we derived great advantage from the practical knowledge which he was able to bring to bear upon the affairs of the undertaking.

The SECRETARY (Mr. R. King) having read the advertisement convening the meeting, and the minutes of the last meeting, the following report and statement of accounts were presented, and taken as read:—

The directors have to report that the working of the company during Mr. Wells's absence from Singapore has not been satisfactory. Up to the middle of October last, from the returns they received, they fully believed that the working was going on as favourably as usual, but at that date it became evident that this was not the case; and on Mr. Wells's return to Singapore, he had to report, upon full investigation, that a considerable deficiency existed in the coal stock. Upon taking stock at the end of the year, this deficiency was found to amount to 856 tons. Apart from this deficiency, the working of the company has been much as usual, and the directors, after much consideration, propose to the shareholders that one-third of the deficiency should be charged to profit and loss for the half year ending Dec. 31, 1870.

Owing to the increase of the consumption of gas, the directors have entered into a contract for a new gasholder, which they hope will be erected complete before the end of the present year.

The directors have to announce, with extreme regret, the death of one of their colleagues, Mr. Benjamin Cooke.

The directors going out of office by rotation are Messrs. William Henry Le Feuvre. Frederick Alexander Malcolm Nicol, and Henry Palfrey Stephenson, and these gentlemen being eligible for re-election, offer themselves for the support of the shareholders.

The present auditors, Messrs. William Thomas Morisson and Alfred Williams, retire from office according to the articles, and, being eligible for re-election, offer themselves to the shareholders for that purpose.

The balance-sheet to the 31st of December, 1870, shows the financial position of the company. The profits for the half year are £1232 13s. 6d. (after writing off for depreciation of works and plant, and off the expenses of first establishment, as per balance-sheet, at the rate of one-half per cent. per annum, £5 off office furniture, and after writing £455 off coal deficiency account) which together with £207 17s., the unappropriated profit of the preceding half-year, makes the available balance £1440 10s. 8d. Out of this sum the directors recommend the declaration of a dividend at the rate of 7½ per cent. per annum, less income-tax, on the preference capital, and a dividend at the rate of 6 per cent. per annum on the amounts paid up on the original capital, free from income-tax; the balance of £15 15s. 11d. to be carried forward to the profit of the succeeding half year.

The dividend to be payable on May 31 next.

The report of Mr. Wells, the engineer and manager, was as follows:—

Gas-Works, Singapore, March 8 1871.

Gentlemen,—In my last report you will have noticed I stated it was necessary for me to return to the East as soon as possible. I arrived in Singapore on the 23rd of November last, and took over the charge of the works on the 24th, and upon examining the state of affairs I found that both the acting managers have been sadly neglecting their duties, especially the one in the yard department, by not paying proper attention to the carbonizing. The retorts were down, a considerable quantity of coal was used, and incorrect returns given, thus causing a deficiency in the coal stock, as will be shown by the reports and statements which I have forwarded to you upon the investigation of the matter.

I immediately set to work to remedy what was wrong, taking the working management of the yard, and also the fitting and out-door department, into my own hands, and it affords me very great pleasure to inform you the concern is again restored to its proper working, and since the 1st of January has been working quite satisfactorily, as you will perceive by the monthly statements, and also by the details of amounts due, &c., which I send you by this mail for the 1st of March accounts. The deficiency in the coal stock I am in hopes to work off by skilful management, and working everything as close as possible consistent with the efficiency of the concern, without affecting your dividends; and in fact I may say, if the present position is maintained throughout the year, I shall be able to place you in a position to give an increase of dividend to the shareholders.

The working for the half year ending Dec. 31 shows an increase in rental of 709·34 dols. over last half year, and in products 127·39 dols. Fittings and sundries have also shown an improvement, and at the close of this half year, if the two months working may be taken as a criterion, it will be a successful one in every respect.

The balance-sheets and statements that have been forwarded to you in the usual course, will with my reports furnish you with all details. I trust you will find them correct and that they will meet with your approval.

The collection on the half year has been very good, and by pushing the collectors for the month of December we were enabled to reduce the arrears to about a month's returns; this I consider very satisfactory.

Rates of exchange have not been so favourable as in the previous half year, having made a loss of 138·89 dols. on the remittances. The rates are still low, but I am in hopes they will improve shortly; we then shall be able to remit you home about £3000.

The process of purifying continues quite satisfactory, with the oxide and ammoniacal liquor process, free from sulphur without the use of lime. The illuminating power is maintained at 13½ candles without the use of cannel coal. The engineer's monthly and half-yearly sheets will furnish you with all details in the carbonizing department.

Since my return I have examined all the ironwork, mains, Valves, &c. The gasholder is perfectly sound, and all the ironwork and woodwork has been tarred and painted, sundry repairs executed, and it affords me very great pleasure to inform you your works, plant, apparatus, and buildings are in a thorough state of repair, and in good working condition for produce and supply.

The only unsatisfactory part is the one gasholder. Several times during the past two months 60,000 cubic feet have been sent out, when the working capacity of the present holder is about 56,000 cubic feet.

I am in hopes next mail to hear that the new holder has been shipped, to enable me to get it into work this year. I cannot proceed with the work for the tank until the arrival of the *Cymbeline* with the shafting, pump, &c.

The fitting department is proceeding quite satisfactorily. Since my return, the three European houses have been lighted, which completes the houses on the line of main over the Princeps estate.

The mains in Bencoolen Street have been laid, and eight public lamps lighted.

The whole staff of fitters are fully engaged, and now the *Havelock* has arrived with mains, I am in hopes to carry out extensions during the present half year in other European districts.

The increase of lights, as shown by the corrected returns for the half year, is 445; houses fitted, 38; public lamps, 2; private lamps, 2.

The total number of lights in use on the 31st of December, 1870, was 7690; houses and public buildings, 623; public lamps, 366; private contract lamps, 11.

I have the honour to remain, &c.

E. J. WELLS.

Dr. *Balance-Sheet, December* 31, 1870. *Cr.*

To Capital—				By Cash at bankers	£2,412 11 5
£5 paid on 2000 preference shares	£10,000 0 0			Ditto in hands of secretary	9 10 8
£5 ,, 7009 ordinary ditto	35,045 0 0			Bills receivable	328 2 6
£2 ,, 25 ,, ,,	50 0 0				£2,750 4
£1 ,, 150 ,, ,,	150 0 0			Office furniture	185 0
9184 shares.		£45,245 0 0		Cost of works and plant, as per last statement	£30,803 15 10
				Add extensions during half year	488 9 8
Debenture bonds		8,320 0 0			31,292 5 6
Sundry creditors		1,633 1 3		Less amount written off for depreciation, at the rate of ½ per cent. per annum	77 0 0
Insurance reserve-fund		14 14 7			31,215 5 6
Profit and loss		1,440 10 8		Purchase of land	1,118 2 8
				Retort account	619 11 11
				Meter renewal account	217 15 4
				Stock on hand	5,697 9 11
				Salaries, passage-money of engineer and workmen to Singapore, travelling expenses, and wages in England	5,239 1 6
				Preliminary expenses and law charges	828 12 8
				Advertising and broker's commission	263 3 0
				Rent of offices, land, stationery, general charges; auditors, directors, and local committee fees; rates and taxes	1,480 9 5
				Loss on exchange	961 5 2
				Interest on capital and loans	2,067 14 2
					10,840 5 11
				Less amount written off previously	148 13 3
					10,691 12 8
				Less amount written off during this half year, at the rate of ½ per cent. per annum	27 0 0
					10,664 12 8
				Gas-meter rental, fittings, and sundries under collection, to Dec. 1	1,134 16 7
				Gas-meter rental, &c., for the month of December, and gas for public lamps for half year	2,115 9 3
					3,250 5 10
				Coal deficiency suspense account	896 14 11
				Sundry debtors	92 0 0
				Travelling expenses suspense account	146 3 2
		£56,853 6 6			£56,853 6 6

Dr. *Profit and Loss Account, from July* 1 *to December* 31, 1870. *Dr.*

To Coal carbonized		£1,736 12 10		By Balance at profit and loss, June 30, 1870	£1,804 18 6
Coal deficiency, suspense account, written off		455 0 0		Less amount declared as dividend, after deducting income-tax on preference shares	1,597 1 6
Lime and oxide		7 13 6			£207 17 0
Trade and general charges		247 17 1		Gas and meter rent	4,621 9 1
Rent, rates, and taxes		78 10 5		Products, profit on fittings, and sundries	758 6 3
Directors and auditors fees		205 5 0			
Salaries and collector's commission		535 19 10			
Wages		354 3 8			
Interest on loans and debentures		299 14 4			
Loss on exchange		31 5 0			
Bad debts and allowances		36 0 0			
Retort account		40 0 0			
Meter renewal account, written off		10 0 0			
Depreciation on works and plant, and accounts in liquidation, written off		104 0 0			
Office furniture, written off		5 0 0			
Balance—profit for appropriation		1,440 10 8			
		£5,587 12 4			£5,587 12 4

The CHAIRMAN: The duty now devolves upon me to move—"That the report, and balance-sheet attached thereto, be received, adopted, and entered on the minutes." The first point to which I would call your attention is the capital account. Comparing the present statement with that laid before you for the half year ending June, 1870, you will find there is an increase of £150—*i. e.*, we have 150 more ordinary shares than we had on the last occasion. This increase is principally due to the erection of a new gasholder, which has been rendered necessary in consequence of the extension of our business. The next item I refer to is that of "sundry creditors." The amount is £1833, which is £1390 in excess of our last statement. The insurance reserve-fund is £2 18s. 9d. more, and the profit and loss £364 7s. 10d. less than at that period. On the other side we have cash in hand, £2750, which is an addition of £374. From the office furniture we have taken £5, and the depreciation is at the rate of one-half per cent. per annum. I next come to the "Gas-meter rental for the month of December, and gas for public lamps for the half year," the amount of which is £247 1s. 6d. in excess of the corresponding item in the June account of last year. Turning to the profit and loss account, you will see that the item of coal carbonized is £177 14s. 8d. in excess of the amount of the last statement. The second item is that of "Coal deficiency suspense account written off, £455." The total loss is approximately estimated at £1350, and the question arose in the minds of the directors whether the whole of that deficiency should be written off at once. But the practical result of that would have been that we should have called you together to tell you that we could pay you no dividend this half year. Mr. Wells, as you will see by his report, was rather in favour of our maintaining the dividend of last year—7 per cent.; but the board thought it was not desirable to do so. They came to the conclusion that it would be wise to distribute the loss over about a period of three half years, and they have dealt with it in that form, at the same time recommending the payment on this occasion of a dividend on the amount paid upon the original capital at the rate of 6 per cent. With regard to the cause of the deficiency in the coal stock, we have had a very elaborate report from Mr. Wells on the subject, in addition to the printed report we sent to the shareholders, and those gentlemen who would like to see it can do so by calling at the office. Mr. Wells, in the report you have in your hands, states that "the acting managers have been sadly neglecting their duties, especially the one in the yard department, by not paying proper attention to the carbonizing. The retorts were down, a considerable quantity of coal was used, and incorrect returns given, thus causing a deficiency in the coal stock." That is how Mr. Wells accounts for the loss. He has been a most active and faithful servant to us; we have placed the most implicit confidence in him, and we take his version of the case. Unfortunately, we are a long way off, and cannot personally investigate the affair; but no doubt the local committee will send us a detailed report in reference to it. With regard to the other items of the account, I do not know that I need take you through them. They differ very little upon a comparison with those of the previous half year. There has been an increase of £150 in the gas and meter rent; products, profit on fittings, and sundries remain about the same. With these remarks I now move the adoption of the report.

Mr. COLLARD seconded the motion.

A SHAREHOLDER asked whether the managers complained of had been long in the service of the company, and were still employed at the works?

Mr. R. J. LAING thought the question of the deficiency ought not to be passed over without an expression by the shareholders of their dissatisfaction with the local committee, who certainly could have paid but little attention to the interests of the company to allow such things to occur. It seemed to him that the most reasonable explanation of the matter was that the deficiency had been going for some time, and that the stock had been incorrectly taken.

Mr. RICE coincided in this remark, and asked whether the directors had any idea that the coals had been purloined.

The SECRETARY said there was no evidence that such was the case.

Mr. RICE said, if his memory served him right, there was a deficiency of this kind a few years ago.

The SECRETARY said there was a deficiency in 1866.

Mr. RICE thought the deficiency might be treated as a bad debt, and £100 a year be written off, instead of so large a sum as £450 in one half year.

Mr. J. NICOL said the proper way would be to write off the whole at once, and not to pay any dividend until it was entirely cleared out of the account.

Mr. RICE said he had faith in Mr. Wells, and believed that he would be able to pull the company through by the expiration of the year, and therefore it was not desirable to write off the whole amount at once.

Mr. MORRISON expressed his approval of the course adopted by the directors.

Mr. WILLIAMS said it was clear that the lost coals could not be recovered, and he would have felt quite satisfied had the directors written off the whole amount at once. The shareholders were certainly receiving money as dividend this half year which they ought not to receive, and he hoped the board would write off the balance of the deficiency as speedily as possible. As there had been a similar occurrence on a previous occasion, there ought to be some check system adopted, and the local committee ought to report monthly to the directors.

The CHAIRMAN, in reply to the inquiries made, said the acting managers had been in the employ of the company for some time, and the directors had had confidence in them. With regard to the local committee reporting from time to time, the directors accepted the suggestion, and the secretary would write out by next mail, and request the committee to carry out the wish which had been expressed. No doubt this matter formed a very important item in the calculations of the board, and it was very desirable they should have proper returns. As stated by a shareholder, there was a deficiency on a former occasion which was extremely unsatisfactory, and it was to be hoped that in future such a thing would never occur again.

The motion was put, and carried unanimously.

The CHAIRMAN moved—"That dividends be declared to the preference shareholders at the rate of 7½ per cent. per annum, less income-tax; and to the ordinary shareholders at the rate of 6 per cent. per annum, free of income-tax, on the amounts paid upon their shares from the respective days of payment to the 31st of December last, such dividends to become payable on the 31st of May next."

Mr. COLLARD seconded the motion, which was put, and carried unanimously.

The retiring directors and auditors were severally re-elected, and the remuneration of the latter was fixed at ten guineas.

On the motion of the CHAIRMAN, seconded by Mr. HUNTER, it was resolved—"That the thanks of the meeting be presented to Mr. Wells, the company's manager at Singapore, for the energetic performance of his duties."

On the motion of Mr. MORRISON, seconded by Mr. RICE, a vote of thanks was given to Mr. Robert King, the engineer and secretary of the company.

The SECRETARY, in acknowledging the compliment, said he was greatly obliged for this expression of the kindness of the shareholders, and of their confidence in him. He was at all times desirous to do the best in his power for the company, and he rejoiced to know that his exertions met with their approval. He deeply regretted the deficiency which the directors had had to report in the coal stock, and could assure the meeting that it had been a source of great anxiety and concern to the board. It was a matter entirely beyond their control, and he hoped it would never occur again.

On the motion of Mr. WILLIAMS, seconded by Mr. LAING, a vote of thanks was given to the directors and local committee for their services, to which was appended an expression of the sympathy of the shareholders with Mr. Stephenson, and their hope of his speedy restoration to health.

The CHAIRMAN: Gentlemen, on behalf of my brother directors and for myself, I beg to acknowledge the vote of thanks you have been kind enough to pass. I need hardly assure you that we take a deep interest in the welfare of the company, and that the promotion of its well-being will still be our constant concern. With reference to our esteemed friend, Mr. Stephenson, I shall have much satisfaction in conveying to him the expression of your sympathy, for which I am sure he will be grateful. He desired me yesterday to assure you of his deep regret that he should not be able to be present at this meeting.

A vote of thanks was given to the auditors, and Mr. MORRISON having acknowledged the same, the proceedings terminated.

THE NICTHEROY (BRAZIL) GAS COMPANY, LIMITED.

The Third Annual General Meeting of this Company was held at the Offices, 5, Great Winchester Street Buildings, London, on Thursday, May 4—CROKER PENNELL, Esq., in the chair.

The SECRETARY (Mr. Walter Wright) having read the advertisement convening the meeting, the report, which had been previously printed and circulated, was taken as read.

The directors have much pleasure in presenting this the third annual report to the shareholders, and are happy to say that the works were erected by the time appointed, and for less than the sum estimated. It is not common to erect works in foreign countries and at considerable distances, within the estimated amount and within the period agreed upon—especially in a country where nearly everything has to be imported—and the directors congratulate the shareholders upon such a result.

In addition to having already secured a larger number of public lights from the Government than was originally granted, the directors look for a further concession in other districts of the city, for which purpose the balance of the shares was lately issued.

The private consumption is also, the directors are glad to say, steadily increasing, and they therefore doubt not that their expectations will be fully realized, and that the company will prove a permanent success.

Annexed will be found a financial statement for the past year, and the directors hope in their next report to show favourable results.

The election of an auditor taking place annually, Mr. Charles Butler offers himself for re-election.

Dr. *Balance-Sheet, to December 31, 1870.* *Cr.*

	LIABILITIES.				DISBURSEMENTS.		
To Capital—				By Purchase of concession, including 535 public lamps		£5,000	0 0
Cash received on 6013 shares, at £10	£60,130	0		Purchase of land for works		2,743	9 11
" " 350 " 9	3,150	0 0		Expenditure on works, plant, stores, and engineering (including bills payable)		44,254	19 0
" " 7 " 8	56	0 0		Administration in England and Brazil (three years)		3,122	14 4
6,370 shares.			63,336 0 0	Interest on capital, to June 30, 1870		2,739	11 9
Bills payable	1,065	4 10		Preliminary expenses in England and Brazil, including agency in the latter, legal expenses, stamps, brokerage, advertisements, &c.		2,799	19 11
Unclaimed dividends—interest warrants not presented	141	17 6		Purchase of coal		2,614	10 11
Stamps—cash for duty on transfers in hand	3	10 0		Meter account—stock		239	0 4
C. Neate—balance due to him	347	18 9		Fitting account		201	14 2
Salaries—amount due	22	7 6		Working expenses		1,782	15 11
Public lighting—amount received to Nov. 30	1,956	16 5		J. Moore and Co., due by them		1,295	11 3
Private ditto—amount received	214	9 0		J. L. Montefiore, due by him		180	14 7
Products—amount received for coke, &c.	103	7 6		Cash at Imperial Bank		216	9 5
			3,855 11 6				
			£67,191 11 6			£67,191	11 6

The CHAIRMAN, in moving the adoption of the report, said he had very little to say in addition to it. The works had been completed by the time appointed, and within the estimated amount, because they made no agreement with any contractors, but had built the works themselves, and built them so well that it will be a long time before any repairs will be required; 260 more lights have been added to the original number of 535, and they have no doubt that before the new works are finished they will have as many more added. They think, therefore, with this, and the increase of private consumption, they will be enabled in due time to give that per centage of the profits and dividends that was promised to the shareholders in the original prospectus. Mr. Gotto, one of the directors, visited the works lately and had inspected them, and he would now convey what he had to say about them. In the report of the directors there was no mention made that one of them would retire. It was in the first resolution that no director should retire until the completion of the works. The works are now completed, and therefore that article did not require to be noticed.

Mr. GOTTO, in seconding the motion, said he had lately visited Brazil, and had taken the opportunity of inspecting the works, and was very gratified to find they were so handsome, and that they were built in the most substantial manner. Mr. Buck, the engineer, had completed them in a manner that gave great satisfaction. It was also very satisfactory to know that the leakage of gas, which in some cases is a considerable item, is so small as to be hardly worth notice. The gas burned there every night was of a much brighter light than they were bound to give.

The motion having been seconded, it was stated, in anwer to a question by Mr. Brand, that the shares would be quoted as soon as any one bought any, but the people who had the shares did not want to get rid of them.

The report and balance-sheet were then adopted.

Mr. MICHOLLS proposed the re-election of the chairman, and Mr. GOTTO seconded the motion, which was carried unanimously.

Mr. GOTTO proposed the re-election of Mr. Charles Butler as auditor, which was seconded, and carried.

The meeting terminated with a vote of thanks to the chairman.

DUNFERMLINE.—THE GAS QUESTION.—A meeting of the Dunfermline Town Council was held last week—Provost Reid presiding. The minutes of the Special Gas Committee showed that the clerk had communicated with the town-clerks of Manchester, Dundee, Greenock, Perth, Glasgow, &c., inquiring the price of gas before and after the acquirement of the gas-works. The manager of the Dunfermline Gas Company had also been communicated with as to whether the company would be willing to enter into an arrangement for handing the same over to the corporation, and had answered in the affirmative.

BAHIA GAS COMPANY, LIMITED.

The Ordinary Half-Yearly General Meeting of this Company was held at the Offices, 76, Coleman Street, London, on Tuesday, April 25—CORNELIUS NICHOLSON, Esq., the deputy-chairman, presiding.

The SECRETARY (Mr. A. J. Head) having read the notice convening the meeting, the following report and accounts were presented:—

The balance-sheet and revenue statement for the half year ending the 31st of December last is herewith presented for the information of the shareholders.

It will be seen that the result of the operations of the company are, by contrast with former periods, satisfactory, and the profits, apart from "Extra disbursements," would have admitted the payment of an increased dividend. Most of these extra charges occurred during the working of former managers. The directors consider it politic to clear the accounts of all arrears and all doubtful credits, and they trust the end of these is now near.

The directors recommend the payment of the usual dividend at the rate of 10 per cent. per annum on the preference shares, and 3 per cent. per annum on the ordinary shares, after which a balance of £152 18s. 9d. will remain to the credit of the profit and loss account.

The private rental exhibits a satisfactory increase, and it is believed that this increase will make gradual progress.

The new redeemable preference shares, to the amount of £5000 (sanctioned at the special general meeting of the company) are all duly placed, 200 shares with £10 deposit were taken on the allotment letters, and the remaining 50 shares were sold to the shareholders applying for them, at 30s. per share premium, yielding a bonus of £75, which will be brought into the reserve-fund in the next half year's accounts. The remaining £10 on these shares will be called up at the end of June next.

Dr. *Balance-Sheet, December 31, 1870.* *Cr.*

To Capital—				By Concession		£7,000 0 0
5000 ordinary shares	£100,000 0 0			Investment—		
1000 10 per cent. preference ditto	20,000 0 0			To June, 1870	£86,223 0 10	
750 ditto redeemable ditto	15,000 0 0			Additional during half year	1,334 9 3	
	£135,000 0 0				£87,557 10 1	
192 ditto ditto, issue of Dec. 31, 1870	1,920 0 0			Freehold land	4,534 16 1	
		136,920 0 0				92,092 6 2
Creditors—				Meters fixed		1,458 11 8
On open accounts	2,524 16 4			Office furniture and fixtures		216 13 0
On acceptances	3,445 13 11			Preliminary expenses		16,914 17 3
		5,970 10 3		Amounts due for gas, fittings, &c.—		
Dividends unpaid		41 3 7		Public lamps	4,452 13 10	
Profit and loss		3,402 18 9		Ditto establishments	4,946 15 9	
Reserve-fund		2 19 2				9,399 9 7
				Private rental, products, and fittings	5,076 17 2	
				Sundry accounts	141 17 1	
						5,218 14 3
				Stock—		
				Coals	4,005 16 5	
				Turba	106 10 3	
				Cotton seed pitch	83 11 4	
				Coke	79 1 2	
				Fittings	2,668 17 10	
				Meters	285 14 8	
				Main and service pipes, lamp-columns, and other materials	2,235 12 10	
						9,465 4 6
				Goods in transit		809 5 1
				Bills receivable		1,503 7 8
				Cash at bank—		
				General account	857 18 10	
				Dividend ditto	41 3 7	
				Bahia	1,284 15 2	
				In London office	4 11 11	
				In Bahia ditto	70 13 5	
						2,259 2 11
		£146,337 11 9				£146,337 11 9

Dr. *Revenue Account, for the Six Months ending December 31, 1870.* *Cr.*

DISBURSEMENTS.				RECEIPTS.		
To Coals carbonized (2538 tons)		£4,827 12 0		By Gas supplied to public lamps	£8,465 19 10	
Purifying materials		75 6 10		Less fines	188 5 9	
Carbonizing wages		929 3 7			£8,277 14 1	
Wages of lamplighters		825 15 9		Private consumers	3,771 11 2	
Labourers, loading coke, &c.		137 8 10		Public establishments	879 18 10	
Salaries		911 0 11				12,929 4 1
Collector's commission		260 15 11		Meter-rental		322 4 0
Directors fees		400 0 0		Products		1,503 12 8
Auditors ditto		21 0 0		Transfer fees		0 15 0
Rent and taxes		174 1 3		Profit on fittings		123 1 8
Interest		82 7 4		Ditto on exchange		429 3 4
Stationery		90 15 1				
Office expenses		33 0 10				
Keep of horses		22 17 2				
Trade charges		142 18 9				
Wear and tear		707 13 9				
Repairs of public lamps		555 14 6				
Ditto of mains and services		82 15 0				
Travelling expenses		68 15 3				
Medical attendance		11 9 6				
EXTRA DISBURSEMENTS.						
Expenses on account of Barra lighting	£216 7 8					
Old water claim, 1862 to 1868	225 0 0					
Property-tax at Bahia, 1867 to 1870	64 1 8					
Ironmongery and stores, 1869 and 1870	107 13 10					
Paving account, to June, 1870	61 11 4					
Bad debts, as per return	802 17 1					
Allowance, ditto	193 6 3					
		1,670 17 10				
Profit		3,276 10 8				
		£15,308 0 9				£15,308 0 9

Dr. *Profit and Loss Account.* *Cr.*

To Dividend declared, Oct. 25, 1870	£3,250 0 0	By Balance of account to June 30, 1870		£3,376 8 1
Balance	3,402 18 9	Revenue account—net profit for this half year		3,276 10 8
	£6,652 18 9			£6,652 18 9
		Balance		3,402 18 9

The CHAIRMAN: Gentlemen, I am called upon to take the chair to-day, on account of the illness of the chairman of the board, Mr. H. P. Stephenson, which I am sure you will regret along with me. I trust, however, from what I have just heard, that Mr. Stephenson is improving in health, and that his indisposition will prove to be but temporary. I next have to give expression to a still deeper grief, occasioned by the sudden death of one of our colleagues, Mr. Benjamin Cooke. He was a man of unusually quick intelligence and clear judgment; he was well versed in all matters of business, especially of finance, and his removal is, therefore, a great loss to the company. He was, moreover, a gentleman of very courteous demeanour and kindly disposition. In his death I for one have to mourn the loss of a friend to whom I was much attached, and I believe my colleagues at the board would each say the same. Turning now to the statement of the company's affairs, which has been submitted to you, I feel quite confident in making this general assertion, that it is the best working account ever presented since the formation of the company. Had it not been for those ugly items under the head of "Extra disbursements," you will all see as well as I can point it out to you that the half year's working would have resulted in a dividend at the rate of 6 per cent. per annum, instead of at the rate of 3 per cent. Certainly, it would have been so, including the item of "Profit on exchange." If the "Extra disbursements" had not appeared in these accounts, in all probability we might have put the £429 of profit on exchange to a reserve-fund; but even without that amount the profit of the last half year would have given a well-grounded dividend of 5 per cent. on the ordinary shares, besides paying 10 per cent. on the preference shares. With reference to these "Extra disbursements" you will expect me to say a word or two upon them. Unfortunately for us, they are charges which have been continually rising up against us for the last five or six years, and, like the ghost procession before Macbeth, it seems as though they would never end, but last until the crack of doom. I trust, however, such will not be the case, but that in a short time we shall get rid of them altogether. I have taken the trouble to ascertain what the company have done since the time I became connected with it under the head of "Extra disbursements," and I find that within four years we have discharged out of revenue, in addition to paying such dividends as have been paid, no less a sum than £8269 in relieving ourselves of the arrears of embarrassments brought upon us by former managers. Calling it in round numbers £8000, it amounts to 8 per cent. on the whole of the ordinary capital of the company, or at the rate of 2 per cent. per annum for the four years. You will surely say, and naturally, that it must have been an Augean stable to need so much cleansing, and you will also say that at this rate of purgation the stable must, sooner or later, be cleansed, and that we must before long be able to present you with a clean bill of health. I think, gentlemen, you will agree with me that it is far better to have the ledger of the company rid of all these so-called credits and assets, so that we may know the worst of our position, and, as soon as may be, get on to a solid foundation. That is the policy which the present board of directors have been pursuing, and I think it is a policy you will approve, and I am persuaded you will see the beneficial results of it in a short time. I must say that we are much indebted to our present manager, Mr. Kilkeary, who has entered into the spirit of the directors in this matter with the view of ridding the company of all embarrassments. Mr. Kilkeary has displayed an amount of mercantile knowledge, zealous care, and sound judgment which has met with our entire approbation. We have in consequence raised his salary, which you know was originally fixed at £500, to £600, with the superadded bonus of £50 per annum for every 1 per cent. added to the 5 per cent. dividend paid to the shareholders, which was always promised to him. We thought this would stimulate his exertions, and that we should find the benefit of it in the future prosperity of the company. It is mentioned in our report that the private gas-rental "exhibits a satisfactory increase, and it is believed that this increase will make further progress." Now, the only progress we can speak of since the time when that report was written is for the two

months of January and February in this year, and I am happy to state that so far the expectations held out in this paragraph of the report are entirely realized. During those two months the private rental increased at the rate of £56 per month, as compared with the corresponding months of the previous year; or, in other words, at the rate of £570 per annum, which is equivalent to 10 per cent. upon the rental. I always expected that as soon as we got the meters into a proper state of registration, and had honest servants to ascertain the state of those meters and collect the amounts due to us, the private rental in Bahia would show a considerable increase. I am looking forward to a still larger increase, for I never could believe that a town like Bahia would yield so small a private rental as this company has presented. It is not at all consistent with the experience of other cities, either in England or on the Continent, and I have reason to hope that in a short time a marked improvement will take place, and that you will receive what you have a right to expect from the altered state of management—a better dividend upon the capital you have invested. I beg now to move—"That the report and statements of account presented be received and adopted."

Mr. LINGING seconded the motion.

Mr. MAUDE said he had always understood that the profit on exchange was to be carried to a reserve-fund.

The CHAIRMAN replied that he had formerly expressed the hope that such would be the case, but if the amount had been carried to a reserve-fund on the present occasion the shareholders could not receive a 3 per cent. dividend.

Mr. MAUDE said he regretted that any necessity should have arisen to require a departure from the wholesome plan laid down so to appropriate those profits because it was obvious that, the capital of the company being exhausted, the formation of a reserve-fund was of the first importance. With reference to the "Extra disbursements," it was a large sum to pay off in one half year, and he thought the directors might have spread the payment over a longer period, and so have retained something in hand for a reserve. A great deal was said at one time about the use of Turba, and £106 was introduced in the present accounts as the value of the stock of that material. He wished to know whether any good had been realized from it. With reference to "Allowances" in the extra disbursements—for which £193 was charged—the term was very vague, and he would like to be informed what it included.

The CHAIRMAN said the term might as well have been "bad debts," because it was the amount allowed to persons to whom it was politic to remit a portion of the sums due from them.

A SHAREHOLDER said at the last half-yearly meeting an allusion was made to a dispute with the Municipal or Provisional Government respecting the public lighting. He wished to know whether that dispute had been arranged on a satisfactory footing.

The CHAIRMAN said he entirely sympathized with Mr. Maude in the desire to have a reserve-fund, and for that purpose to appropriate the profit on exchange, but, as he had stated, to do so on this occasion would be to deprive the shareholders of their 3 per cent., or to carry over a portion of the extra disbursements to a future time. The matter was discussed at the board, and it was felt to be desirable at once to clear the obstacles out of their way, so that the company might go on satisfactorily in future. The favourable rate of exchange still continued, and the directors would probably be able this half year to appropriate the profits so realized to a reserve-fund. With regard to the Turba, he had always had his doubts about its value, and was particularly opposed to speculative experiments, for not once in a thousand times were the results satisfactory in practice. Laboratory experiments and practical working operations were distinct and very different things, and he was sorry the company had ever had anything to do with Turba, for they had lost money by every pound expended upon it. As to the public lighting, it was true there had been questions between the company and the Provincial Government, both with regard to the price charged for the public lamps and some arrears arising out of the claim made by them on this account, also with reference to the payment of Customs dues for materials carried into Bahia by the company; but he was happy to state that, so far as any of those questions had been decided, they had been decided in their favour. There were great difficulties in dealing with such matters in Brazil, and one of the reasons why the directors appointed Mr. Kilkeary was that he was a man possessed of a large amount of commercial knowledge, and was able to treat with the authorities with intelligence and judgment. It was to his skill and energy that the satisfactory changes in the company's affairs at Bahia were principally due. The question of the public lights, the directors were informed by the last mail, was likely to be settled soon, and, he hoped, in their favour.

The motion was put and carried unanimously.

The CHAIRMAN moved—"That a dividend at the rate of 10 per cent. upon the preference capital, and of 3 per cent upon the ordinary capital, less income-tax, for the half year ending the 31st of December, 1870, be now declared."

Mr. LINGING seconded the motion, which was put, and carried.

The CHAIRMAN, in reply to an inquiry, said the dividend would be payable at the end of May.

On the motion of Mr. MORRISON, seconded by Mr. MAUDE, a vote of thanks was given to the directors, and to Mr. Nicholson for his conduct in the chair, which having been acknowledged the proceedings terminated.

MAURITIUS GAS COMPANY, LIMITED.

The Ordinary General Meeting of the Members of this Company was held at the Offices, 39, Old Broad Street, London, on Wednesday, April 26—W. WHITE, Esq., in the chair.

The SECRETARY (Mr. Hersee) read the following report of the directors, and also the accounts:—

The directors have the pleasure to lay before the shareholders the accounts for the twelve months ending the 31st of December, 1870. The undertaking has been worked by the directors only since the 30th of June last, but the results obtained during the half year, justify them in believing that the company's position is sound, and that its progress will be steadily maintained.

Fifty-five new consumers have been added to the list, with an aggregate increase of 374 burners. The total numbers of lights on the 31st of December last were—public 600, and private 2987. Orders have since been received for 20 additional street-lamps and many private lights.

The quantity of gas sold in the year 1870 compared with the year 1869 shows an increase of more than 20 per cent. Cooking-stoves for gas and also for coke are being introduced, and it is hoped that by this means the revenue of the company may be still further improved.

The directors have been enabled to purchase the piece of ground formerly dividing the company's property. The land belonging to the company now comprises upwards of three acres, and is considered sufficient for all requirements.

The only extension undertaken during the half year consisted of the laying of about 600 yards of 3-inch main.

The erection of a jetty on which to land coal and stores, and which has been consented to by the authorities, is under the consideration of the directors.

The resident committee take a warm interest in the welfare of the company and their co-operation and influence are heartily given to the furtherance of its prosperity.

The profit and loss account shows a balance of £1621 15s. 8d. The directors have resolved upon the payment of a dividend at the rate of 6 per cent. per annum to the 31st of December last, for the period which has elapsed since the respective instalments of capital were received, and the same will be paid, free of income-tax, on the 2nd prox.

The director who retires by rotation is John Allan, Esq., and the retiring auditors are John Robinson Peill and Thomas Newton Stokes, Esqs., all of whom are eligible for re-election, and offer themselves accordingly.

The CHAIRMAN: Gentlemen, the report just read explains generally the position of the company. When the directors met you in September last, the result of their investigation into the condition of the property and the prospects of the company were laid before you. The last six months experience only confirms the views they then expressed that a favourable purchase had been made on behalf of the shareholders, and that all the anticipations held out in the original prospectus will be realized. The business as regards the public lights has been stationary during the last half year, but 20 new lights have been ordered this year, which is a move in the right direction, and more orders are expected. The private lighting is very satisfactory. We have a good number of Chinese in Mauritius, and many of them are adopting gas as well as the European community. We have about 300 consumers at present, of whom about one-sixth have been obtained since the formation of the company. Estimates are in hand for lighting the railway terminus, the Roman Catholic cathedral, and other buildings, which if accepted will considerably swell the revenue. A large portion of the inhabitants being French, the use of gas cooking-stoves has been introduced. We are fostering this habit because we believe it is economical for the consumers, and at the same time beneficial to the company. We mention in our report that we have purchased a small portion of land at a very satisfactory price. There was a public road passing through our gas-works. Mr. Mellor very judiciously took possession of the road as part of our property, and when it was objected to he purchased it of the authorities, and enclosed it in our works. The land would have been very inconvenient to us if it had remained as a public road; and as we have now acquired it, we believe we have now sufficient for all the purposes of the company. With reference to coal, we find by experience that the Australian coal is the best we can use; and the directors have endeavoured to arrange for a regular supply of it, so that we shall not be dependent in any way upon consignments from this side, although we can always obtain such consignments if they should become necessary. The residual products command a ready sale, at remunerative rates. Further efforts will be made to increase the demand, and it is hoped the Asiatics will use the coke for cooking purposes. The question of the construction of a jetty is one which requires great consideration on the part of the board. The engineer's design is now before them, and if approved and decided upon, will be forwarded to Port Louis for the assent of the authorities there. The resident committee continue their exertions. They exercise a vigilant supervision over all local affairs, and assist the manager by their advice. Their services are much valued by the board. The dividend is for 7¼ months on £1 per share, and for two months on the call from the 1st of November. So far as we can see, there is no prospect of a further call at present. The prospects of the company are encouraging. The island is just now very jubilant in the expectation of an abundant sugar crop, and the general prosperity of the inhabitants must have the effect of increasing our business and thereby our dividends. With reference to the reserve-fund, I may say that the net profit from January to June last year, handed over by the persons of whom we purchased the property, not being money earned by the company, the directors have determined to set aside to meet any contingencies which may arise, and this will materially strengthen our position. The concern, as far as we are able to judge at this distance, is going on quite as well as we expected; and, as I began by stating, we consider that we shall be able to carry out all the promises of the original prospectus. We think we have a nice little property, which will pay us increasing dividends year by year as we proceed. I now move—"That the report and accounts be received and adopted."

Mr. LEWIS CUBITT seconded the motion, which was put, and carried unanimously.

On the motion of the CHAIRMAN, seconded by Mr. CHALONER SMITH, the retiring director, Mr. John Allan, was re-elected.

On the motion of Mr. FAWCETT, the retiring auditors, Messrs. J. R. Peill and T. N. Stokes, were also re-elected.

Mr. ALLAN and Mr. PEILL returned thanks.

The CHAIRMAN announced that cheques for the dividend would be ready on the 1st of May.

A vote of thanks to the directors was cordially adopted, and the CHAIRMAN acknowledged the same.

The SECRETARY, in responding to a vote of thanks for his services, said he was very grateful for the expression of the approval of the shareholders, which it would be his constant aim and study to deserve. The compliment paid to him was much enhanced by the very kind manner in which it was proposed.

On the motion of Mr. PEILL, a vote of thanks was given to Mr. Mellor, the company's engineer, for the energy and zeal displayed by him in conducting the arrangements for the transfer of the property.

Mr. MELLOR, in acknowledging the vote, said he had done all in his power to see that all the stipulations of the contract into which the company entered with Messrs. Hanna, Donald, and Wilson were carried out, and that the property handed over to them was as good as represented. He stated at the last meeting that he found it was so. The works were very substantial, four or five times larger than was necessary at present, which, however, was evidently a fault in the right direction. He fully endorsed all that the chairman had said as to the prospects of the company. It was only a small concern as yet, and like all gas undertakings, they had somewhat of a struggle during the first stage of existence. The early difficulties were now past, and he had not the smallest doubt that year by year they would make satisfactory progress, and receive a good dividend on their investment.

GAS FOR MADRAS.—A proposal to light the town of Madras with gas made by Messrs. King and Stephenson, of London, came before a general meeting of the Municipal Commissioners on March 31. The terms of the proposal were generally approved, and it was resolved, subject to several modifications, to forward the proposal to Government, for the purpose of ascertaining the views of His Excellency the Governor in Council on the matter. A proposal of the Singapore Gas Company, of a similar nature, was also discussed at the same meeting, and was likewise referred to Government. In both cases certain concessions are asked for by the Municipal Commissioners from Government.

SHEFFIELD WATER COMPANY.—The forty-first ordinary meeting of the Sheffield Water Company was held last week. The chairman (Mr. W. Cockayne), in moving the adoption of the report, remarked that the profits of the past year would be very satisfactory to the shareholders. There was an increase on revenue of £3114 0s. 7d., consequently the amount required to be taken from the reserve-fund, to enable a dividend of 3 per cent. to be paid, was £615 1s. 11d. less than last year. The speaker added that, if they had sold their works to the corporation, it would have been a great mistake. When the Loxley scheme was finished, he thought they would be able to supply 20 gallons per head per day to a population of half a million. Mr. Hydes wished to know if, supposing the company should ever have the good fortune to be able to pay 10 per cent., and still have a surplus, such surplus could be used to pay up back dividends. Mr. Blakelock Smith said such would be the case. Mr. Greaves remarked that it might be as well if the company treated the Town Council with a little more civility. The chairman confessed that the building in Division Street was really not understood, his subsequent remarks implying that, if any one imagined that the directors had erected the offices in question with any desire to ornament the town, they were mistaken; they had been built wholly for the convenience of the water company. Mr. F. E. Smith thought that to consider terms with the Town Council would be "the height of folly." At the same time, he had no wish to be unnecessarily offensive to that body, "provided the water company could have their own way, and accomplish their end in a pleasant manner." The meeting was then made special, for the purpose of considering the proposed increase in the capital. The chairman proposed the necessary resolution, which was seconded by Mr. Waterfall, and carried.

EQUITABLE GASLIGHT COMPANY.

The Half-Yearly Ordinary General Meeting of this Company was held at the Offices, John Street, Adelphi, on Tuesday, May 2—Sir JAMES DUKE in the chair.

The SECRETARY (Mr. Andrews) read the notice convening the meeting, and the following report of the directors:—

The directors have pleasure in submitting, for the information of the shareholders, the usual accounts, showing the result of the company's operations for the half year ending the 31st of December last.

The gas-rental for the half year amounted to £46,406, and the products realized £10,011, being an increase in the last item of £1406 on the corresponding period of the previous year.

Dr. *Manufactory and Revenue Account, for the Half Year ending December 31, 1870.* *Dr.*

To Tradesmen's accounts, purification, &c.	£427	3	10	By Gas-rates, to Dec. 31, 1870	£46,406	9	6
Coals carbonized	23,291	10	11	Meter-rental	839	14	11
Wages (manufacture only)	4,910	12	4	Coke, net sales and stock	7,753	17	6
Rent, rates, and taxes	1,817	19	2	Breeze, ditto	48	9	10
Directors fees	750	0	0	Tar, ditto	1,443	0	11
Auditors ditto	45	0	0	Ammoniacal liquor	966	0	0
Salaries	1,825	13	11	Interest account	185	13	11
Collectors commission	376	11	10				
Stationery and stamps	117	10	0				
General charges	443	7	2				
Bad debts and allowances	51	8	6				
Wear and tear	4,167	15	3				
General law charges	6	6	6				
Income and property tax	98	18	10				
Depreciation of leasehold property and plant on ditto	364	10	4				
Net profit to Dec. 31, 1870	19,448	18	0				
	£57,643	6	7		£57,643	6	7

Dr. *Balance-Sheet, December 31, 1870.* *Cr.*

To Capital, joint-stock—				By Investment to June 30, 1870	£274,092	14	0
Old shares, £50	£200,000	0	0	Less depreciation of plant, &c.	354	16	0
New ditto, £25	100,000	0	0		£273,737	18	0
Dividends	56	2	4	Charged this half year	4,471	13	9
Tradesmen's accounts, &c.	6,741	3	1			£278,209	11 9
Taxes, rates, &c.	548	8	9	Meters		6,985	19 5
Collectors commission	185	3	0	Cash on deposit		7,088	9 6
Auditors	45	0	0	Ditto balance		2,840	0 8
Income and property tax	222	0	3	Gas-rates		29,023	18 8
Profit and loss	34,363	2	11	Accounts due for coke, &c.		5,393	9 10
Contingency-fund	10,213	11	2	Coals, stock		2,296	9 3
				Coke, ditto		332	16 0
				Breeze, ditto		2	1 8
				Tar, ditto		103	18 2
				Ammoniacal liquor, ditto		43	15 0
				Service-pipes, ditto		199	15 8
				Main-pipes, ditto		303	12 11
				General stores, ditto		1,419	2 6
				Leasehold property		7,928	10 6
				London and North-Western debenture stock (£10,261)		10,210	0 9
	£352,374	11	6			£352,374	11 6

Unappropriated profits, to June 30, 1870	£14,914	4	11
Net profit to Dec. 31, 1870	19,448	18	0
Amount available for dividend	£34,363	2	11

The net profit amounts to £19,448 18s., from which the directors recommend the payment of a dividend of 5 per cent. on the half year, less the income-tax.

In pursuance of the resolution passed at the extraordinary meeting of shareholders on the 7th of February last, the directors have promoted jointly with the Gaslight and Coke Company—usually called the Chartered Gas Company—a bill in Parliament taking powers for the amalgamation of the two companies.

The essential part of the arrangement is that the shareholders of the Equitable Company will be entitled under it to a preferential dividend of 10 per cent. per annum (that rate being the maximum one authorised by the company's Act), or to a rate not less than such maximum as the companies may hereafter be restricted to by Parliament, and the directors cannot but look upon these terms as advantageous to the shareholders.

The bill has passed the House of Commons, and been read the first time in the House of Lords, and will probably pass during the current half year.

The following directors, viz:—Sir James Duke, Bart., and John Holdship, Esq., and John Stroud, Esq., auditor, will go out of office by rotation; and, being eligible, they offer themselves for re-election.

The CHAIRMAN: Gentlemen, our reports are generally so clear and satisfactory that they leave very little for the chairman to say in moving their adoption. I am happy to assure you that our works continue to be maintained in the best possible condition, and that the dividend we propose to declare to-day is most honestly and faithfully earned. We have had, as, perhaps, you are aware, a slight accident to one of our gasholders. It is now in course of repair, and will not entail much expense upon us. With that exception our works are in first-rate condition. I may mention that the bill for the amalgamation of this company with the Chartered Gas Company has passed the House of Commons and been read a first time in the House of Lords. The committee upon it will probably be appointed in the course of a week or two, and before long I hope it will become law, and prove a satisfactory arrangement for our shareholders.

A SHAREHOLDER: In the event of the bill passing, when shall we be handed over to the Chartered Company?

The CHAIRMAN: On the 1st of July, supposing the bill to be passed before that time; if not then, on the 1st of January following. I now move—"That the report of the board of directors, together with the accounts, as examined and certified by the auditors, be received and entered on the minutes."

Mr. RHODES seconded the motion.

Mr. ILSLEY asked whether, in the event of the amalgamation taking place, this company would be liable for any portion of the cost of reinstating the damaged gasholder at the Beckton works of the Chartered Company.

The SECRETARY said such a question could not arise, because the loss arising from that accident fell not upon the Chartered Company but upon the contractor for the works.

Mr. LIDDLE asked if there was any reason to suppose that a legislative change would be made in the maximum dividends allowed to gas companies. It seemed to him, from the terms of the clause in the amalgamation scheme relating to this subject, that the possibility of such a change was contemplated by the directors.

The CHAIRMAN said he hoped there was no chance of an alteration being made. The terms employed were in accordance with the Chartered Company's Act and with the agreement made with them.

Mr. LIDDLE said he very much doubted the propriety of the amalgamation, and he was happy to say he had always opposed the idea of it.

The motion was put, and carried unanimously.

The CHAIRMAN moved—"That a dividend be now declared out of the profits of the company, for the half year ending the 31st of December last, of £2 10s. per share upon the old shares, and of £1 5s. per share upon the new shares, less income-tax."

Mr. KELLY (deputy-chairman) seconded the motion, which was put and carried.

The retiring directors, Sir James Duke and Mr. Holdship, were re-elected.

Mr. HOLDSHIP, in returning thanks on his re-appointment, said he was the oldest director of the company, having been on the board for 31 years. At the time he joined—at the earnest request of a large body of shareholders—the company were in the greatest difficulty, and the directors became liable individually for thousands of pounds. The shareholders, however, supported the directors on all occasions, and he attributed much of the present prosperity of the undertaking to that circumstance, offering to them his thanks for their uniform kindness, even when it was not possible to pay them a dividend. The position of the company now was *nulli secundus*, and he did not much wonder that, under the circumstances, some of the shareholders should regret the proposed amalgamation. The directors had carefully considered the matter, and, looking to the contingencies which might interfere hereafter, they did not feel justified in refusing the offer of a preferential 10 per cent. backed by the large capital of the Chartered Company. He wished it to be distinctly understood that on the part of the directors it was an act of self-abnegation, but in the interests of the shareholders at large they could not do otherwise. As to the position of the Equitable, there could not be a better testimony given than that of the deputy-governor of the Chartered Company, who remarked at their special meeting that the accounts of the Equitable Company will bear comparison with those of any other company in London. It has been an admirably managed company, and, as I have already intimated, has enjoyed many advantages from its proximity to the river." The governor also expressed himself very strongly in praise of this company; but, notwithstanding, the directors felt they could not refuse the admirable offer made to them of a secured dividend of the full amount allowed by law, and hence they had confidently recommended the amalgamation to their constituents.

The CHAIRMAN having also returned thanks, the retiring auditor, Mr. Jno. Stroud, was re-elected.

Mr. TATHAM, in accordance with notice given at the last meeting, now brought forward a motion for increasing the remuneration of the auditors to £150, from the 1st of January, 1871. In doing so he said he was not aware till last November that the auditors had been so inadequately remunerated. He found, upon investigation, that of the eleven companies in London none paid their auditors so badly as the Equitable. Even the four whose rental was below that of this company gave a larger sum annually for the performance of this important service, and there certainly was no reason that he was aware of why this state of things should continue longer.

Mr. LINGING seconded the motion.

A SHAREHOLDER asked whether any arrangement had been made for giving compensation to the auditors in the event of the amalgamation, as was done in the case of other officers of the company.

The CHAIRMAN said he was sorry to inform the meeting that up to this time no such arrangement had been made, and he thought it was a great hardship upon the auditors. It could not be done in the bill before Parliament, because the proposition was opposed by the Board of Trade; but he hoped some means would be found to acknowledge their valuable services.

The motion was put and carried.

Mr. ILSLEY asked whether it was competent to the meeting to take any step for placing the auditors in the position desired on the completion of the amalgamation.

The CHAIRMAN said the board of directors could do nothing in the matter—it rested entirely with the shareholders; but the directors would do all in their power to carry out any resolution the meeting might adopt for compensating the auditors.

Mr. KELLY said the remuneration of the auditors and of the secretary was left to the shareholders; in every other case the directors decided the question.

Mr. PRATT presumed, from what had fallen from the chairman, that, in the opinion of the directors, there was fair ground for compensating the auditors on their loss of office. He was under the impression that some arrangement for that purpose had been made on previous amalgamations. In order, however, to put the matter in a tangible form, he would move a resolution thereon—"That the board be requested to make arrangements for securing to the auditors a remuneration of £150 each, in the event of the amalgamation, and to convene a special meeting for the purpose, or otherwise, as they may be advised."

Mr. LIDDLE seconded the motion.

Mr. HADLAND said, in the case of the auditors of the City of London Company, those who retired in accordance with the scheme of amalgamation were paid a bonus equal to one year's remuneration."

The motion was put and carried.

Mr. J. M. HOLDSHIP, one of the auditors, returned thanks for the vote just adopted.

Mr. WATSON said the statements made to the meeting as to the admirable condition of the company's works and the success which had attended all their operations called for the thanks of the proprietors to those who had been instrumental in bringing about such a prosperous state of things. As a director for many years of one of the largest gas companies in London, he knew from experience how much the board must necessarily depend upon their principal officers, and when he reminded the meeting that Mr. Andrews, the secretary of this company, had been in their service more than 20 years, and had most successfully negotiated the terms of the amalgamation with the Chartered Company, by which the permanent interest of the shareholders was secured, he thought it would not be necessary to say anything further in submitting the motion he was about to make. One of the terms of the agreement entered into with the Chartered Company was that Mr. Andrews should have a retiring allowance of £800 per annum, and he was sure the directors of both companies desired honourably to carry out that arrangement. Under the provisions of the bill before Parliament he would only receive two-thirds of his salary, and the only way to secure the £800 a year was by passing such a resolution as the following:—"That in consideration of the long and able services rendered to the company by our secretary, Mr. Samuel Andrews, and with a view to facilitate the fulfilment of the agreement for amalgamation with the Gaslight and Coke Company so far as concerns him, his salary be and it is hereby raised as and from the 1st day of January, 1871, to £1200 per annum; and that the board of directors be requested to take all such steps, either by calling a special meeting of shareholders or otherwise, as may be found necessary or desirable to carry this resolution into effect." With regard to the question of amalgamation, he (Mr. Watson) would simply say that he thought the directors had shown great wisdom in bringing it about, and thus securing to the shareholders a safe 10 per cent. on their investment.

Mr. ILSLEY thought it was not regular to adopt such a proposal without notice of motion having been given.

Mr. WATSON said it no doubt was more convenient that notice of motion should be given, but there was no bye-law requiring it, and the circumstances of the case precluded its being done.

Mr. ILSLEY said he considered that a special meeting ought to be called for the purpose. He agreed that Mr. Andrews was entitled to all they could give him, but the mode in which it was proposed to be done seemed to him quite irregular. The salaries of the other officers of the company were fixed by the directors, and he wished to be informed whether they had been raised.

Mr. KELLY said the other officers would be transferred to the united company at their present salaries, but Mr. Andrews would retire altogether.

Mr. LIDDLE, while desiring that Mr. Andrews should receive the full amount of his salary, objected to the introduction of the motion without notice, because it was not the ordinary business of a general meeting.

Mr. BARBER said this was not the first amalgamation which had taken place in which a secretary retired, and he asked what course was adopted by the City Gas Company.

Mr. HADLAND said Mr. Millar had been in the service of the City Gas Company for upwards of fifty years, and in the scheme of amalgamation by which he was displaced the retiring allowances were the same as were now proposed. But with reference to Mr. Millar, the shareholders, at their last ordinary meeting, passed a resolution making him a retiring allowance of the full amount of his salary.

Mr. BARBER thought it would be advisable to add a few words to the motion, requesting the board to convene a special meeting, if necessary, to legalize the proceeding.

Mr. PINCKARD said it had only been the custom of late years that notice was given of an intention to propose an increase in the salary of the secretary.

The CHAIRMAN said if the motion were carried, the directors would give the shareholders an opportunity to meet and confirm it.

The motion was then put, and carried, with two dissentients.

Mr. ANDREWS returned thanks.

On the motion of Mr. HADLAND, seconded by Mr. LIDDLE, thanks were voted to the directors for their services, and the chairman acknowledged the same.

Thanks were also voted to the auditors, the secretary, and the other officers of the company, and the proceedings then terminated.

ON THE REDUCTION OF LIGHT DUE TO THE PRESENCE OF CARBONIC ACID IN ILLUMINATING GAS.

By FRED. E. STIMPSON.

[Read before the American Association for the Advancement of Science, Troy Meeting.]

It is a familiar fact that carbonic acid gas is incapable of burning, and that a flame of any kind plunged in an atmosphere containing a large amount of it is immediately extinguished. Its presence, therefore, in considerable quantity, in ordinary illuminating gas, might be expected to impair its illuminating power. But in the small proportion of 1 or 2 per cent., in which, at some manufactories, it is allowed to remain in the gas, the evil is so inconspicuous as to have led to the belief that a more complete removal of the impurity is practically of no importance.

The opinion has even been advanced, that in such small quantities its action is merely that of diluent, serving, when present in such gas, to facilitate the combustion, to the extent, at least, of compensating for the loss of light it might otherwise occasion.

These reasons in favour of an incomplete removal of the carbonic acid are moreover strengthened by the fact, that in separating the last portions of this impurity by the dry lime or other purifying process, we at the same time arrest a small portion of the illuminating ingredients of the gas, and thus run the risk of weakening instead of strengthening its illuminating power.

These vague and uncertain impressions as to the action of small quantities of carbonic acid, and as to the economy of its removal, suggest the importance of a thorough experimental investigation on the subject, and have led me to make the series of observations which follow; offering, I believe, the first conclusive results thus far published on this interesting question in the science and economy of gas lighting.

Mode of conducting the Experiments.

1. The carbonic acid was evolved from bicarbonate of ammonia, by the action of dilute sulphuric acid, using the common form of self-regulating apparatus, and passing the gas through water in a wash-bottle properly connected with the exit-pipe.

2. The mixture of carbonic acid and gas was made in a diaphragm gasholder, from which it was afterwards delivered to the burner in the photometric experiments. To effect this mixture, gas was turned on to one side of the diaphragm, and the other compartment, as far as possible, emptied. The carbonic acid was then turned in upon the latter until a sufficient volume was introduced, then this compartment was filled with gas, the first gas admitted being expelled in corresponding quantity from the other side. The whole being closed in, the vessel was repeatedly inverted and turned from side to side, with the view of thoroughly incorporating the contents, and when this was thought to be effected, and before connecting the holder with the photometrical apparatus, a portion of the mixture was taken out for analysis.

3. The per centage of carbonic acid in the mixture was determined in a graduated tube over mercury. In the first experiment the tube was filled by displacement through mercury. Afterwards it was found more convenient, and quite as accurate, to fill by displacement with a long inserted tube in air.

The absorbent was a ball or rod of caustic potassa (the latter being the more prompt), fixed upon the end of a long wire.

4. The illuminating power was determined by passing successively the common gas and the mixture through the same dry meter, at equal or nearly equal rates (5 feet per hour), and burning them from the same 15-hole Argand burner, and comparing their respective lights with a third light, also burning 5 feet per hour, at the other end of a photometric bar, 150 inches long.

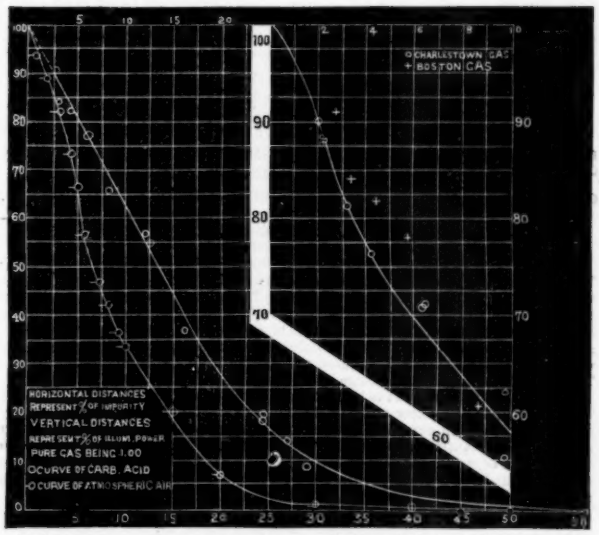
These two results were then reduced to equality of delivery.

		Experiments.	CO_2.	Ill. Power.
(1.)	Boston gas, containing about		2·6 p.c.	1·000
	Mixture, "	by determination	24·	·203
	" "	"	26·6	·152
	" "	"	16·25	·400
	" "	"	8·75	·667
(2.)	Boston gas, "	"	2·5	1·000
	Mixture, "	"	12·5	·609
	" "	"	29·	·084
	" "	"	58·5	·000
(3.)	Boston gas, "	"	2·50	1·000
	Mixture, "	"	24·	·193
	" "	"	12·	·619
(4.)	Boston gas, "	"	2·8	1·000
	Mixture, "	"	4·6	·903
	" "	"	4·4	·936
(5.)	Boston gas, "	"	2·4	1·000
	Mixture, "	"	3·3?	·921
	" "	"	5·8	·854

Note.—From the above we obtain the following table:—Allowing 2·6 per cent. = to produce a loss of 2·6 × ·0364 = ·094 loss of light.

Pure Gas 0.	Per Cent. CO_2. Ill. Power = 1000.	Loss.	Per Cent. Loss Ill. Pow. for each per Cent. CO_2.
2·6	= ·906	·094	..
3·3? (4·3)	·840	·160	5
5·8	·779	·221	4
4·5	·820	·180	2
8·75	·604	·396	4½
12·	·563	·437	3½
12·5	·554	·446	3½
16·25	·363	·637	3½
24·	·183	·817	3½
24·	·175	·825	3½
26·61	·137	·863	3½
29·	·076	·924	3½
58·5	·000	1·000	..

I have put these results in the form of a curve, and, for the purpose of comparison, have added a curve representing the loss due to the addition of atmospheric air, taken from Audouin and Bérard's experiments. *Annales de Chimie*, &c., 1862.—F. E. S.


CHARLESTOWN GAS
BOSTON GAS
HORIZONTAL DISTANCES REPRESENT % OF IMPURITY
VERTICAL DISTANCES REPRESENT % OF ILLUM. POWER PURE GAS BEING 1.00
CURVE OF CARB. ACID
CURVE OF ATMOSPHERIC AIR

In the next experiments the gas was passed through hydrated lime, according to the ordinary method of the dry-lime process.

(6.)	Boston gas, carbonic acid (undetermined)	1·000
	The same purified through lime "	1·060
(7.)	Boston gas, carbonic acid, 2·2 per cent.	1·000
	The same partially purified	1·030

The difference between experiments 6 and 7 may have been partly due to the presence of a larger amount of carbonic acid in the former case. This small effect on the illuminating power of the 2 per cent. of carbonic acid taken out is in striking contrast with that observed in the former case, where 2 per cent. was added, and leads to the suspicion that the lime removes some of the illuminating ingredients at the same time that it abstracts carbonic acid.*

(8.)	The lime was removed and replaced by broken fragments of pumice-stone, boiled down in solution of potassa (13°) until the water was nearly all evaporated.		
	Partially purified gas, carbonic acid	0·3 p.c.	1·070
	Boston gas, "	2·7	1·000
	" purified "	0·	1·055
(9.)	" "	2·7	1·000
	" purified "	0·5	1·073
(10.)	Boston gas	2·58	1·000
	Purified so that it did not act on baryta water while passing through for five minutes	0·	1·061
	The same partially purified	1·61	1·035

* Indeed, both in these and the next two experiments with potassa, the purifying material was coloured slightly green by the absorption of some other ingredient than carbonic acid. It was found, also, that the lime and potassa soon ceased to act upon the acid, and, on opening the purifier, this loss of action was accounted for by finding the purifying material quite *dry*. Its action could be restored again, for a time, by re-moistening it. That this inaction does not occur so soon when the crude and sulphurous gas is acted upon in the ordinary dry-lime process, I think, is quite clear, for I have frequently determined the carbonic acid in gas purified by that process, and have found almost without exception, that when the sulphuretted hydrogen was taken out, I could discover but faint traces of carbonic acid. And it has been equally true that, when sulphuretted hydrogen was present, carbonic acid was also present.—F. E. S.

These results not being altogether satisfactory, further experiments were made upon gas manufactured by the Charlestown Gaslight Company, in the office adjoining their works.

This gas was purified by the dry-lime process, and, being nearly free from carbonic acid, was well suited for determining the effect of small additions of this impurity on the illuminating power. Observations with the absorption-tube, made at intervals during the continuance of the experiments, gave the percentage of carbonic acid in the gas 0·3, 0·3, 0·2, 0·2.

The following table gives the results obtained by these experiments—pure gas being 1·000:—

Per Cent. Carb. Acid in Gas.	Illuminating Power.	Loss of Illum. Power.	Loss per Cent. Illum. for per Cent. CO_2.
1·0	1·000	..	—
1·9	·900	·100	5·2
2·1	·888	·116	5·5
2·2	·878	·122	5·5
3·1	·814	·186	6·
4·2	·769	·231	5·5
6·6	·707	·293	4·4
6·7	·710	·290	4·3
9·7	·555	·444	4·5
9·7	·618	·318	3·9

From these results it would seem that at least 10 per cent. of the light was destroyed by the addition of 2 per cent. of carbonic acid; and it is but reasonable to expect that, if we could take out that 2 per cent. without removing any illuminating ingredient, there would be a corresponding gain.

DR. WHITMORE'S REPORT ON THE QUALITY OF THE WATER SUPPLIED IN ST. MARYLEBONE, IN MARCH, 1871:—

March, 1871.	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by Incineration of Solid Matter in previous column.		Ammonia.
	Mar., 1870. 0°	Mar., 1871. 0°	Mar., 1870. 0°	Mar., 1871. 0°	0°
Distilled Water . . .					
West Middlesex water .	18·96	20·96	0·64	0·82	—
Grand Junction water. .	19·72	21·32	0·84	0·88	—

* The loss by incineration represents the amount of organic and other volatile matters contained in an Imperial gallon (70,000 grains) of water.

DR. WHITMORE'S REPORT ON THE QUALITY OF THE GAS SUPPLIED IN ST. MARYLEBONE, IN MARCH, 1871:—

March, 1871.	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quantity of Sulphur in 100 Cub. Ft.	Mean Quantity of Ammonia in 100 Cub. Ft.	Sulphuretted Hydrogen.
	*Mean of 24 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Imperial Company's gas . . .	16·63	17·21	15·34	28·62	10·64	36·62	0·68	None.
Chartered Company's common gas	16·80	17·81	16·02	40·68	16·07	33·94	1·91	None.
Chartered Company's cannel gas	23·71	24·76	23·00	34·12	15·08	27·18	3·31	None.

Mean of daily readings of barometer . . . 29·83
" " thermometer . . . 56·73

* Each observation consists of 10 readings of the photometer, at intervals of one minute.

The illuminating power of all the gases consumed in the parish during March was generally very good. The mean of the Imperial Company's gas was equal to the light of 16¼ candles, and ranged from 17·21 to 15·34 candles. The mean light of the Chartered Company's common gas was equal to nearly 17 candles, and ranged from 17·81 to 16·02 candles. The mean light of the cannel gas was equal to more than 23½ candles, and ranged from 24·76 to 23·00 candles. The quantity of sulpher was large in all the gases; but the Imperial Company's gas contained the most. It is important that the gas referees should determine without further delay how much of this noxious and highly deleterious impurity shall be permitted in every 100 cubic feet of gas, as well as the process by which its presence—quantitatively—shall be determined. At present gas may contain any amount of it, and there is no law to prevent it. It is satisfactory to find, on the other hand, that every month shows a gradual diminution of ammonia in the gas, and as the process for its entire removal is both inexpensive and easy, I think it would be wise on the part of the gas company to take immediate steps for getting rid of it altogether. The pressure of all the gases was satisfactory, and on no occasion did the usual tests discover traces of sulphuretted hydrogen in either of them. The above results were obtained from the gas manufactured by the Imperial Company, at their Fulham works, and from the Chartered Company's gas manufactured at their works, Horseferry Road, Westminster.

AVERAGE COMPOSITION AND QUALITY OF THE METROPOLITAN WATERS, IN APRIL, 1871.—The following are the returns of the Metropolitan Association of Medical Officers of Health:—

Names of Water Companies.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	18·73	0·057	0·184	0·001	15·0	4·1
West Middlesex	19·10	0·026	0·190	0·001	15·2	4·0
Southwark and Vauxhall . .	20·27	0·085	0·161	0·001	15·4	4·4
Chelsea	18·27	0·051	0·191	0·001	15·0	4·1
Lambeth	19·63	0·067	0·181	0·002	15·4	4·2
Other Companies.						
Kent	27·83	0·029	0·281	0·000	21·1	5·9
New River	19·00	0·026	0·187	0·000	15·0	4·0
East London	20·41	0·067	0·211	0·001	15·4	4·8

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases but the following, when it was slightly turbid—namely, in the case of the Grand Junction and the Lambeth water. The average quantity of water supplied daily to the metropolis during the preceding month was, according to the returns of the water companies to the Association of Medical Officers of Health, 101,555,774 gallons; and the number of houses supplied was 473,941. This is at the rate of 31·2 gallons per head of the population daily. HY. LETHEBY, M.B.

SAN PAULO GAS COMPANY.—Notice has been given that the second half year's interest due to the shareholders of the San Paulo Gas Company will be payable on and after the 8th inst. The board has received advices from Brazil confirming the increase in the number of public lamps; also an order for 600 private lights, which is deemed highly satisfactory.

NEW RESERVOIR FOR STOCKPORT—The Stockport District Water-Works Company have just let some large contracts for the Bollinhurst reservoir and covered conduit at Lyme Park. When this work is completed the company will have a storeage of 160 days supply, independent of what the streams would yield and in addition to the one million gallons a day which the Manchester Corporation Water-Works are required to furnish.

THE SEWAGE QUESTION AT ELY.—Mr. J. Bailey Denton has, at the request of the Local Board of Health, reported on the best means of utilizing the sewage and improving the sanitary condition of the city of Ely. He recommends that the sewage should be conveyed, partly by gravitation and partly by pumping, to the Turbotsey farm, and there to be used for irrigation. He estimates the cost of executing the necessary works at £7980, exclusive of easements and engineering expenses.

REDUCTION IN THE PRICE OF GAS AT PRESTON.—At a meeting of the Preston Town Council, on Thursday last, it was reported that a deputation from that body had waited upon the gas directors with a view of securing a reduction in the price of gas, and that after two interviews the company had promised to make a change equivalent to a reduction of 5 per cent. in the case of all whose annual consumption did not exceed 200,000 cubic feet. The council passed resolutions acknowledging the reduction, but regretting at the same time that a greater concession had not been made, so as to enable the public of the town generally to enjoy the same advantages as other towns in respect to cheap gas.

UTILIZATION OF THAMES SEWAGE.—The Native Guano Company have accepted the tender of Mr. Webster, the contractor for the Thames Embankment, for the construction of their new works adjacent to the pumping-station at Crossness, near Erith, on the Plumstead Marshes, which were some time ago inaugurated by the Prince of Wales. Operations have been commenced for the erection of the works, which will consist of five enormous wrought-iron tanks, sufficiently large to contain each day's pumping, drying-sheds, warehouses, &c., and the company, which for some time past has been engaged in the utilization of the sewage of the towns of Warwick and Leamington, are very sanguine as to the results of the undertaking.

STOURBRIDGE.—THE GAS QUESTION.—At the meeting of the Stourbridge Commissioners, held last week, the General Purposes Committee presented a report on the gas question, in reply to the statement submitted to the commissioners from the gas company. The committee also reported in favour of erecting new gas-works. They computed that the erection of works for manufacturing 20 million cubic feet of gas annually would involve an outlay of £5882. Gas might be sold to consumers at something like 2s. 6d. per 1000 feet, and it was estimated there would be a balance, after paying working expenses and interest of money, of £1282 annually. The committee suggested that a public meeting be called to consider the question of the supply of gas to the township. A motion for the reception of the report was carried.

THE CARDIFF GAS SUPPLY.—Mr. Drane, the gas tester to the Cardiff Local Board, reported as follows last week, viz.:—"I have tested the gas at the town-hall once in each week since my last report. I have found the illuminating power equal, on an average, to 13·23 candles; but this estimate is to be taken with the same qualification as my last. There has been a reduction of th ammonia previously spoken of as in excess. There is also an absence of sule phur (as sulphuretted hydrogen). I have visited the gas-works at Grangd Town, where every facility for acquiring any desired information was afforde me, and I found the illuminating power of the gas, by the company's instru ment, to exceed rather than fall short of the proper standard. Before my nex report I shall have effected some improvement in existing arrangements at the town-hall; and when I have quite decided what is essential to efficiency, I shall ask you to authorize the necessary outlay."

ZINC WATER-TANKS.—The *Lyon Medical* contains an article, by M. Zinrek, who has examined water which had long been kept in such tanks. He has found that the water dissolves so much the more zinc as it contains more chlorides, such, for example, as the chloride of sodium. The water also takes up larger quantities of zinc in proportion to the length of contact. Boiling does not, however, precipitate the zinc from water charged with the metal. A sample of the former was tried, in which the chlorides were in small proportion, but which has been a long time in a zinc tank. As much as 15 grains of zinc was found in each quart. To prevent this state of things, the author advises the zinc tanks to be coated inside with an oil paint, the bases of the paint being ochre or asphalte. No minium, ceruse, or carbonate of zinc should, however, be used. Fifteen grains in a quart seems an enormous proportion. nor does the author say whether he found the actual metal or a salt of oxide of zinc.

DR. STEVENSON'S REPORT ON THE ILLUMINATING POWER OF THE GAS SUPPLIED IN ST. PANCRAS, IN MARCH AND APRIL, 1871.—The average illuminating power of the gas in March was 15 candles, the maximum being 15·8, and the minimum 13·9 candles. The Imperial Gas Act says that the illuminating power shall not be less than 14 candles. The examinations are made according to the requirements of the Metropolis Gas Act, 1860; if they were made according to the instructions of the gas referees under the Imperial Gas Act, the illuminating power of the gas would appear to be about one-sixth higher, and it would be perceived that the gas has not during the month of March fallen below the statutory illuminating power. The amount of sulphur was 19·49 grains per 100 cubic feet. No permissible maximum is assigned to this impurity in the Imperial Act. Sulphuretted hydrogen was never present on examination. Ammonia was present in small quantities on each examination.—In April the average illuminating power of the gas was 15 candles, the maximum being 15·7, and the minimum 14·3 candles. The gas did not fall below the standard of 14 candles. The average illuminating power was the same as during the preceding month; but the gas varied to a less extent, there being a higher minimum and a lower maximum of illuminating power. The amount of sulphur was 20·41 grains per 100 cubic feet. This is about the usual amount. Sulphuretted hydrogen was never present. Ammonia was present in small quantities at each examination.

LIVERPOOL IMPROVEMENT AND WATER BILL.—The select committee of the House of Commons on this bill sat last week to hear evidence. The principal facts adduced by the promoters of the bill will be found in the evidence of Mr. Hawksley (engineer), who said that, while the cost of the water on the whole would come to 6d. per 1000 gallons, the cost of the summer water alone, for the reason stated, would come to nearly 1s.; and he thought it was a mistake to charge only 3s. for the public supply to the out-townships. In fact, the extra expense of the summer water had not been taken into account. The present maximum charge for domestic purposes was 5½d., equal to 1s. in the pound.

Then there was the 6d. rate for the same property, making 1s. 6d. in the pound; also a 6d. rate for three quarters of a million of other property not taking the domestic supply (warehouses, &c.), which would be 2d. more, making 1s. 8d.; and the corporation also contributed out of the public funds an amount equal to another penny, making the total cost equal to 1s. 9d. in the pound within the borough. At present the outside consumers were liable to a maximum of 5 per cent., the same as those inside, *plus* 1¼ per cent. extra; but they were charged only 3d. per 1000 gallons, *plus* 1¼ per cent., which would make the charge 1s. 3d. in the out-districts as against 1s. 9d. in the borough. It was now suggested, by a proviso, that the present maximum should never be exceeded in the charge to the out-districts, that maximum being 1s. 3d. *plus* a very small sum (less than a halfpenny in the pound) for the water used for public purposes. At the close of the evidence the committee, after deliberating fifteen minutes, announced that they approved of the principle of the proposed charges for water, with the proviso suggested by the promoters themselves, that the present maximum charge of 6¼ per cent. (the present actual charge being 5 per cent.) should never be exceeded in the case of the out-townships. The promoters, therefore, have obtained all they applied for in reference to water, the limitation of the maximum being their own offer.

THE GAS-WELLS OF ERIE.—It is something worthy of extra notice to find a city lighted, and its dwellings warmed, with natural gas, procured merely at the expense of boring for water. Erie rejoices in this blessing, and the subject is still sufficiently new to be interesting. The first presence of gas was noticed four years since, in digging a potash-well within the city limits, the flow of gas from which nearly suffocated the workmen. This well was filled up, but the same result occurred in another near by. Experiments were then made by sinking tubes in the mud of a stream and igniting the escaping gas, which burned freely. To a Mr. Brevillier, an intelligent German, is due the first practical action. This gentleman, associated with a few others in a company, sunk a well for petroleum on his premises. As an oil-well it was a failure, but as a gas-machine a splendid success. For three years it wheezed and *gas-ed*, until, the lease of the company expiring, the proprietor laid pipes conveying the gas to his house and soap-works, where it has since been used. Not one pound of coal has been consumed since then in the establishment. The various processes of melting, rendering, and soap-boiling are carried on with gas as the fuel, the building is illuminated, while a beacon on the roof lights that portion of the city. With all this, and the amount used for lighting, warming, and cooking in his dwelling, but one-sixth of the gas furnished by the well can be used, the remainder escaping through a safety-valve. At the Conrad Brewery a gas-well was lately opened, by which vats of lager are kept boiling, and malt-ovens working with an even temperature, the steam-gauge standing at 75 lbs. per square inch day after day, without a change of a pound per day, and all without care from any one. The uniformity of pressure keeps the stream of flame under the boiler or kiln at an exact strength, supplying the most perfect heat for brewing. But one-fourth of the gas from this well is used. The city, also, has utilized the product with the happiest results. A well was put down by the City Gas Company near the main reservoir, which has yielded a uniform daily supply of 24,000 cubic feet. This is conducted directly into the reservoir, and 12,000 feet of manufactured gas added, thus furnishing the daily supply of the city. Hear how a private individual luxuriates in native fuel, free of cost. State Senator Lowry has a model well, from which pipes lead to every grate in the house, to the kitchen range, and to smaller pipes for chandeliers. In fire-places are laid the French imitations of wood, pierced with minute openings to permit the escape of gas, thus simulating the cheerful blaze of the wood fire. An inch pipe supplies the unconsumable firewood, while a small bronze wheel regulates the supply by a turn. With 14 fires burning, 60 gaslights in the house and grounds, the senator lives in an atmosphere of perpetual summer. He even warms the cellar for the purpose of a laundry drying-room. The only unpleasant thing about this wonderful supply is the question of permanence. This is hopeful, however, for the first well, sunk for oil, is in its seventh year, with an undiminished yield of gas, while in some cases, as at the Erie Car-Works, the supply increases with time. The average depth of the Erie wells is 600 feet, and the cost about 1500 dols. As each well yields from 10,000 to 30,000 feet of gas per day, they generally repay their cost within three months. With the proximity of iron ore and facilities for receiving the ores of Lake Superior, Erie presents a splendid opportunity for the manufacture of iron with this fuel, free of cost. It is strange that, with the energy for which the place is noted, this has not been attempted. Iron should be made here for 12 dols. per ton, if not less. Be this as it may, these wells certainly afford a most curious and gratifying evidence of Nature's bounty.—*Iron Age*, U.S.

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

1049.—WILLIAM WILLIAMS BOX, of Crayford, in the co. of Kent, for "*Improvements in apparatus used in the manufacture of gas.*" April 21, 1871.

1085.—JAMES HUNTER, of Coltness Iron-Works, in the co. of Lanark, N.B., for "*Improvements in furnaces, and in the employment of the waste gases thereof.*" April 24, 1871.

1131.—ALFRED VINCENT NEWTON, of 66, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in street and other lamps and lanterns.*" A communication. April 28, 1871.

1207.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., Southampton Buildings, London, patent agents, for "*Improvements in the construction of draught-tubes or globes designed to be used as a substitute for the globes ordinarily placed on gas-burners.*" A communication. May 4, 1871.

1210.—HENRY ALEXANDER FREDERIC DUCKHAM, of Camden Town, in the co. of Middlesex, gas engineer, for "*Improvements in apparatus for controlling or regulating the supply of gas to burners.*" May 4, 1871.

1211.—ADOLPHE PIERRE VASSARD, of New Cross, in the co. of Kent, chemist, for "*Improvements in treating liquid sewage and other ammoniacal liquors in order to obtain manure therefrom.*" May 4, 1871.

GRANTS OF PROVISIONAL PROTECTION.

221.—ROBERT BOYLE, of Glasgow, in the co. of Lanark, N.B., for "*Improvements in ventilators and smoke-extractors.*" Jan. 27, 1871.

247.—CHARLES JOHN GALLOWAY and JOHN HENRY BECKWITH, both of Manchester, in the co. of Lancaster, for "*Improvements in valves blowing engines, also applicable to air and other pumps.*" Jan. 30, 1871.

804.—RICHARD DOVER, of 5, St. Stephen's Road, New Road, Hammersmith, in the co. of Middlesex, for "*A mode and means for preventing the flow or passage of sewage into rivers or streams from the sewers, drains, and other channels, and retaining the sewage matters for agricultural purposes.*" March 24, 1871.

936.—THOMAS WILLIAM ATLEE and GEORGE JOBSON ATLEE, trading under the style or firm of Atlee and Son, of Birmingham, in the co. of Warwick, manufacturers and druggists factors, for "*Certain improvements in the construction of taps for drawing off fluids and the means of applying the same to casks.*" April 8, 1871.

1007.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., Southampton Buildings, London, patent agents, for "*An improved apparatus for raising, forcing, and exhausting air, gas, water, and other fluids.*" A communication. April 15, 1871.

1008.—FRANCIS GEORGE FLEURY, of 24, Merrick Square, Southwark, in the co. of Surrey, engineer, for "*Improvements in meters or apparatus for measuring flowing liquids.*" April 15, 1871.

1033.—BENJAMIN HARLOW, of Macclesfield, in the co. of Chester, engineer, for "*Improvements in the manufacture of cast-iron pipes and in apparatus therefor.*" April 19, 1871.

1036.—DAVID SPENCE, of Manchester, in the co. of Lancaster, manufacturing chemist, for "*Improvements in the treatment of spent oxide of iron arising from the purification of gas, or the said oxide when partly spent.*" April 19, 1871.

NOTICES TO PROCEED.

3269.—FREDERICK LUDEWIG HAHN DANCHELL, of Horwich, in the co. of Lancaster, engineer, for "*Improvements in apparatus for treating sewage matter, and for filtering sewage and other water.*" Dec. 14, 1870.

3315.—ROBERT RUSSELL, of Liverpool, in the co. of Lancaster, for "*Improvements in filters and the fittings connected therewith.*" Dec. 19, 1870.

846—THOMAS HALL, of 78 and 79, Bassinghall Street, Leeds, in the co. of York, brassfounder, for "*Improvements in water-closet cisterns.*" March 29, 1871.

857.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*Improvements in the manufacture of gas for illuminating and other purposes, and in the apparatus used therein.*" A communication. March 30, 1871.

869.—ALFRED VINCENT NEWTON, of 66, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in fluid-meters.*" A communication. March 31, 1871.

897.—JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, in the co. of Middlesex, gentleman, for "*Improvements in packings for piston-rods, pipe-joints, and other purposes, and in the mode of and apparatus for making such packings.*" A communication. April 4, 1871.

Share List of Metropolitan Gas Companies.

Number of Shares issued.	Amount per Share.	Name of Company.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Latest Quotations.
	£		£ s. d.	£ s. d.	£
8000	20	Anglo-Romano	20 0 0	10 0 0	22 — 23
5000	20	Bahia (Limited)	20 0 0	3 0 0	12½— 13
1000	20	Do., preference	20 0 0	10 0 0	23 — 25
750	20	Do., do., redeemable	20 0 0	10 0 0	20 — 22
40000	5	Bombay (Limited)	5 0 0	4 10 0	6¾— 7¼
10000	5	Do., third issue	4 0 0	4 10 0	1¼—½pm.
10000	20	British (Limited) (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbdge., & Holywll.)	20 0 0	10 0 0	31½— 32½
7500	20	Cagliari (Limited)	20 0 0	7 0 0	19½— 20½
112000	10	*Chartered*	10 0 0	8 0 0	14½— 15½
10000	10	Do., B shares, 4 per cent. max.	10 0 0	4 0 0	6¾— 7¼
25000	10	Do., 5 per cent. preference	10 0 0	5 0 0	12¼— 13
20000	10	Do., 5 per cent. preference, second issue	8 0 0	5 0 0	2—½pm.
20000	10	Do., 10 per cent. preference	10 0 0	10 0 0	19½— 19¾
17490	25	*Commercial*	25 0 0	10 0 0	42 — 44
20000	20	Continental Union	20 0 0	8 0 0	24½— 25
10000	20	Do., new	7 10 0	8 0 0	2½—3 pm.
5213	20	Do., preference (France: Strasbg., Cette, Nismes, Montargis, Vienne, Roanne, Beaucaire, Rueil, Albi. Italy: Milan, Genoa, Parma, Modena, Alessandria, Messina.)	20 0 0	7 0 0	25 — 27
5000	10	*Crystal Palace District*	10 0 0	10 0 0	16 — 16½
5000	10	Do., preference	10 0 0	6 0 0	11 — 12
6044	10	Do., new shares	10 0 0	7 0 0	12 — 13
3956	10	Do.	1 0 0	7 0 0	1¼— 1½
4000	50	*Equitable*	50 0. 0	10 0 0	92 — 94
4000	25	Do., new shares	25 0 0	10 0 0	45½— 46½
23406	10	European (Limited)	10 0 0	11 0 0	15¾— 16¼
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	11 0 0	3 — 3½
5000	10	Hong Kong (Limited)	10 0 0	9 0 0	12 — 13
26000	50	*Imperial*	50 0 0	10 0 0	85 — 87
26000	10	Do., new shares	10 0 0	10 0 0	17 — 17½
26000	12½	Do., new shares	12 10 0	7 0 0	15½— 16½
25000	12½	Do., new shares, 1870	5 0 0	7 0 0	2—2½ pm.
1300	100	Do., bonds	£100	10 0 0	170 —175
56000	50	*Imperial Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Stolberg, Toulouse, & Vienna.)	43 15 0	9 2 6	67 — 68
400	100	Imperial Mexican (Limited)	100 0 0	nil.	
200	100	Do., new	100 0 0	nil.	
3000	40	*Independent*	40 0 0	10 0 0	67 — 69
3000	10	Do.	10 0 0	5 0 0	7½— 8½
3000	20	Do.	17 0 0	7 10 0	3½—4¼ pm.
7133	50	*London*	50 0 0	10 0 0	84 — 86
5610	25	Do., 1st preference	25 0 0	6 0 0	27½— 28½
503	50	Do., 2nd preference	50 0 0	6 0 0	
214	50	Do., 3rd preference	50 0 0	6 0 0	
£18781	100	Do., 1st preference stock	100 0 0	6 0 0	
£11828	100	Do., 2nd preference stock	100 0 0	5 0 0	
15000	5	Nictheroy, Brazil (Limited)	5 0 0	4 10 0	3½— 3¾
6000	5	Malta and Mediterranean (Limited)	5 0 0	7 0 0	4¾— 5¼
20000	5	Do., preference	5 0 0	6 0 0	2½— 2¾
30000	5	Mauritius (Limited)	5 0 0	10 0 0	7¼— 8¼
30000	5	Oriental (Calcutta)	2 10 0	10 0 0	1½—2 pm.
10000	5	Do., new shares	5 0 0	nil.	1¾— 2¼
14000	10	Ottoman (Limited)	10 0 0	8 0 0	11 — 12
27000	20	*Phœnix*	20 0 0	10 0 0	33½— 34½
3600	100	Do., new	40 0 0	7 10 0	52 — 54
144000	8l.	Do.	100 0 0	5 0 0	84 — 87
5000	20	*Ratcliff*	20 0 0	10 0 0	32 — 34
	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	29½— 30½
6959	5	Singapore (Limited)	5 0 0	6 0 0	
2000	5	Do., preference	5 0 0	7 10 0	
1500	32½	Shanghai	32 10 0	12 0 0	
4000	50	*South Metropolitan*	50 0 0	10 0 0	89 — 91
4000	12½	Do.	12 10 0	10 0 0	21½— 22½
20000	12½	Do., new shares	2 10 0	10 0 0	5—6 pm.
15000	10	*Surrey Consumers*	10 0 0	10 0 0	16 — 17
10000	10	Do., new	6 0 0	10 0 0	4¾—5¼pm.
9000	4	United General (Limerick)	4 0 0	5 0 0	2¾— 2¾
1500	10	*Wandsworth and Putney*	10 0 0	10 0 0	12 — 13
1500	10	Do.	10 0 0	7 10 0	
1819	10	Do.	10 0 0	7 10 0	
1138	10	Do.	5 0 0	7 10 0	
20000	10	Western (Limited) A shares	10 0 0	10 0 0	17 — 18
10000	10	Do., B shares	9 0 0	10 0 0	6 —7 pm.
10000	10	Do., C shares	9 0 0	10 0 0	6 —7 pm.
20000	10	Do., D shares	1 0 0	10 0 0	2¾—3 pm.
16000	5	*West Ham*	5 0 0	8 0 0	6¼— 6¾
10000	5	Do., new shares	1 0 0	8 0 0	1¼— 1½
551	10	West London Junction (Limited)	10 0 0	6 0 0	
520	10	Do., preference	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1 in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle and Middlesboro'.	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1 (g.m.b.)	3 15 0	2 15 6	2 11 0	3 10 0	3 15 0
1¼ and 2-inch Socket-pipes	7 0 0	5 15 0	5 10 0	6 0 0	7 0 0
2½ and 3-inch ditto	6 10 0	5 5 0	5 0 0	5 15 0	6 10 0
4 and 5-inch ditto	6 0 0	4 15 0	4 10 0	5 5 0	6 0 0
6 inches and upwards ditto	5 15 0	4 5 0	4 0 0	5 0 0	5 15 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 5 0	5 0 0	5 10 0
Ditto, 2nd ditto, cold ditto	6 10 0	—	—	—	6 10 0
Tank-plates, ¼ thick and above	6 0 0	5 0 0	4 15 0	5 10 0	6 0 0

WROUGHT-IRON TUBING,

Subject to 60 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 14 feet—per foot	1 8	1 1	0 10	0 7	0 5	0 4½
Ditto ditto, from 12 in. to 23½ in.—each	3 0	2 0	1 6	1 1	0 9	0 8
Long Screws, from 12 in. upwards	4 0	2 3	2 0	1 6	1 2	0 11
Bends and Springs	4 3	2 3	1 9	1 3	0 11	0 8
Square Elbows, equal or reducing; Round Elbows, 5 per cent. extra	3 9	2 3	1 9	1 3	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 9
Crosses, ditto, equal or reducing	4 9	3 6	3 0	2 3	1 9	1 6
Iron Cocks	20 9	13 0	10 0	7 3	5 0	3 8
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4½
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

FREIGHTS.

Coastwise—Newcastle:—	Per Ton.	*Foreign:*—	Per Keel.
Chatham and Rochester	5s. 6d	Barcelona	£21 0s
Cork	8 0	Bordeaux	9 0
Dover, Folkestone, and Ramsgate	6 0	Boulogne and Calais	7 0
Dublin	8 6	Cadiz	10 10
Exeter Quay	8 0	Cronstadt	9 10
Ipswich	5 6	Copenhagen	8 0
London (from Leith)	6 6	Genoa	15 0
London (Pool)	6 0	Hamburg	7 0
Lowestoft and Yarmouth	5 3	Havre de Grace	7 15
Portsmouth & Southampton	7 0	Leghorn	17 10
Plymouth	7 6	Lisbon	10 0
Shoreham	7 6	Rotterdam	7 0
Whitstable	6 3	Stettin	9 10
Weymouth	7 6	Trieste	18 10
		Venice	19 10

GAS COALS.

	Per Ton.
Newcastle—Unscreened:—	6s. 6d.
Haswells, Nettlesworth Primrose, and South Pelaw	
Felling, Framwell Gate, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	7 6
Burnhope, Craghead, Charlaw, Derwent, East Castle, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, Pelaw Main, Ravensworth, Seaham, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton	7 0
Pearetb, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	7 3
Brancepeth, Dean's Primrose, Londonderry Gas, New Pelton, Pelton, South Pearetb, Stella, Urpeth, Washington Hutton, and West Leverson	7 6
Ramsay's Newcastle Cannel	17 6
Wigan Cannel (at Liverpool)	17 0
Welsh Cannel:—	
Coppa Cannel (on rails at Birkenhead), 13s. 6d.; ditto (on rails at Connah's Quay)	13 0

Scotch Cannel, f.o.b.:—	Per Ton.	*Scotch Cannel, f.o.b.:*—	Per Ton.
Boghead—at Bo'ness, 47s. 6d.; at Leith	48s. 2d	Arniston (at Leith)	21s. 0d
Muirkirk	27 0	Wemyss (at Wemyss')	20 0
Kirkness, best (at Burntisland)	22 6	Haywood Co.'s Haywood (at Granton)	21 0
Capeldrae, 1st quality (at ditto)	23 6	Pirnie, or Methill	17 0
Ditto, 2nd ditto (at ditto)	17 6	Lothian's Cannel (at Leith)	24 6
Cowdenbeath (at ditto)	13 0	Grange ditto (at Bridgeness)	17 6
Lochgelly (at ditto)	12 0	Kinniel ditto (at Bo'ness)	17 6
Donnibristle—at Burntisland, 12s.; at Aberdour	12 6	Mylea' ditto	23 6
Auchinheath Lesmahago (at Granton)	27 0	Lochore Parrot (at Burntisland)	25 0
Duke of Hamilton's Lesmahago (at Granton)	27 6	Do. (at Waverley Seam)	16 0
		Lanemark (at Glasgow)	16 0
		Elphinstone Tower (at Leith)	20 0

SUNDRIES.

Best Newcastle Fire-bricks, per 1000	£2 10s. to £2 15s. 0d.
Cliff's Fire-bricks (at Wortley), per 1000	2 15 6
Ingham's ditto (at Wortley), per 1000	2 15 0
Farnley Iron Co.'s Fire-bricks (at Wortley), less discount	2 17 0
Fire-clay Retorts, per foot run	5s. 6d. to 0 7 6
Tarred Rope Yarn, per cwt.	1 0 0

THE

DUKE OF HAMILTON'S

LESMAHAGOW

CANNEL COAL.

LESSEES:

THE NITSHILL & LESMAHAGOW COAL COMPANY.

OFFICE:

37, ST. VINCENT PLACE,

GLASGOW,

Where all communications are requested to be addressed.

BIRMINGHAM GASLIGHT & COKE COMPANY.

REDUCTION IN THE PRICES OF GAS.

THE Directors of this Company hereby announce that from the commencemet of the next quarter their PRICES FOR GAS, by Meter Indication, will be REDUCED to the following scale of charges:—

All under 25,000 cubic feet per qr. 2s. 7d. per 1000
25,000 and under 100,000 " " 2 5 "
100,000 and upwards " " 2 3 "

Subject to a discount of 5 per cent. for quarterly payments in cash, provided no arrears remain of former quarters, either for gas or fittings.

Meters supplied by the Company free of charge.

By order of the Directors,
JOSEPH HARBISON, Secretary.

Offices, Union Street, Birmingham, April 12, 1871.

COKE BREEZE.

THE Directors of the Surrey Consumers Gas Company are open to receive TENDERS for their produce of COKE BREEZE, particulars of which may be obtained on application to the ENGINEER, at the Company's Works, Rotherhithe, to whom tenders are to be sent, endorsed "Tender for Breeze," on or before the 15th day of May, 1871.

Rotherhithe, April, 28, 1871.

RUTHIN GASLIGHT COMPANY.

THE Directors of the above Company are desirous of receiving TENDERS for the construction of a 15 000 feet GASHOLDER, BRICK TANK, and a set of new PURIFIERS.

Parties desirous of tendering may see the drawings and specifications upon application at the Offices of the Company, at Ruthin, on and after the 5th inst., between the hours of Ten and Four o'clock.

Tenders addressed to the undersigned to be delivered on or before Saturday, the 20th inst.

The Directors do not bind themselves to accept the lowest or any tender.

DAVID JONES, Secretary.

Ruthin, May 2, 1871.

MANCHESTER CORPORATION GAS-WORKS.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee are prepared to receive TENDERS for the purchase of the whole or portions of the GAS TAR to be produced at these works, for the term of One or more years, as may be agreed upon, commencing on the 1st day of March next. The total quantity that will be produced during the first year is estimated at 2,750,000 gallons or thereabouts.

Sealed tenders, addressed to the Chairman of the Gas Committee, Albert Chambers, Albert Square, and endorsed "Tender for Gas Tar," must be delivered at this Office on or before the 15th day of June next.

The Committee do not bind themselves to accept the highest or any tender.

Further particulars as to conditions of contract and forms of tender may be obtained on application to Mr. Peacock, at the Gas Office.

By order of the Gas Committee,
JOSEPH HERON, Town-Clerk

Gas Office, Albert Chambers, Albert Square, April 28, 1871.

TOWN OF DUDLEY GASLIGHT COMPANY.

CONTRACT FOR GAS COALS.

THE Directors of the above Company invite TENDERS for the supply of 8000 tons of Screened GAS COAL, as free from sulphur as possible, to be delivered in trucks free, at Netherton Station, Great Western Railway, between July 1 next and June 30, 1872.

Rates of delivery subject to arrangement.

Terms of payment monthly, in cash, less 2½ per cent. discount.

Tenders to be addressed to the SECRETARY, and endorsed, "Tender for Gas Coal," on or before the 30th inst.

The Directors do not bind themselves to accept the lowest or any tender.

Gas-Works, Dudley, May 3, 1871.

TO COAL AND CANNEL PROPRIETORS.

THE Directors of the Cheltenham Gas-light and Coke Company invite TENDERS for the supply of the best quality of CANNEL and COAL for making gas in the district affording the supply, for One, Two, or Three years, from the 1st of July next.

For quantities, particulars, and conditions of contract, application to be made to the Company's Engineer.

Sealed tenders, addressed to the Engineer, must be forwarded on or before Thursday, the 18th prox.

R. O. PATERSON, Engineer.

Gas-Works, Cheltenham, April 24, 1871.

EDGE'S PATENT

FOR REMOVING THE

CARBONACEOUS INCRUSTATION FROM GAS-RETORTS.

"*Gas-Works, Bury St. Edmund's, Oct.* 24, 1870.

"Dear Sir,—In answer to your inquiry about Edge's patent method of scurfing Retorts, I beg to inform you that I can give it my unqualified recommendation.

"Some years ago, in order to facilitate the scurfing process, I introduced open-ended Retorts here, and found them a great improvement upon the common Retorts, which, in addition to the damage they received at scurfing times, were very leaky for several days afterwards. Even with that plan there was a considerable amount of labour and care, which I have avoided since the adoption of Edge's method.

"I find the amount paid for royalty less than the entire cost of open-ended Retorts; and in addition, that less labour is required and less damage is done to the Retort in scurfing.

"As Edge's method does not burn the carbon out of the cracks so much as most other plans, and my stokers are pleased with it, I regard it as invaluable in reducing one of the anxieties of the gas manufacturer.

"Having a steam-engine on the premises, it was easy of adoption here, but my opinion of it is so high that I would recommend all gas managers who are not so situated, to provide themselves with a portable steam-boiler, and am sure that they will never regret the investment.—I am, dear sir, yours truly,

"E. Goddard, Esq." "THOS. H. METHVEN.

For particulars and terms, apply to **E. GODDARD, Sole Agent, Gas-Works, IPSWICH.**

MAIDSTONE GAS-WORKS.

TO GASHOLDER MAKERS.

THE Directors of the Maidstone Gas Company are prepared to receive TENDERS for the supply and erection of a GASHOLDER, 100 ft. diameter by 30 ft. deep, with columns, girders, &c., according to drawings and specifications which may be seen at the Offices of the Company.

Sealed tenders, addressed to the Chairman, to be delivered at the Offices of the Company on or before the 24th of May, 1871.

The Company do not bind themselves to accept the lowest or any tender.

BEALE AND HOAR, Clerks to the Company.

Maidstone, May 4, 1871.

THE Directors of the Over Darwen Gas Company are prepared to receive TENDERS for the erection and completion of a set of Condensers, Scrubbers, and Purifiers, plans and specifications of which may be seen and full particulars obtained on application to JAMES GREEN, Engineer.

Tenders to be sent in not later than Thursday, May 25, and endorsed "Tender for Condensers," &c.

THE Wallasey Local Board are prepared to receive TENDERS for the supply of a station Meter, Steam-Engine, and Exhauster, and a set of Pumps all to be fixed complete and ready for work at their Gas-Works, Great Float, near Birkenhead.

Specifications and all necessary information may be had on application to the Engineer, at his Office at the said works.

The Contractor will be required to enter into a bond with approved sureties for the due performance of the contract, which contract and bond will be prepared at the expense of the Contractor.

Sealed tenders, addressed to the Chairman of the Gas and Water Committee, and endorsed "Station-Meter" or "Engine," &c., as the case may be, to be left at my Office, Church street, Egremont, near Birkenhead, before Three o'clock in the afternoon of Wednesday, the 24th inst.

The Board reserve the power to accept the whole or part of a tender, and do not bind themselves to accept the lowest or any tender.—By order,

T. SOMERVILLE JONES, Clerk to the Board.

Public Offices, Egremont, May 8, 1871.

CONTRACT FOR TAR AND LIQUOR.

THE Directors of the Wandsworth and Putney Gas Company are prepared to receive TENDERS for the TAR and AMMONIACAL LIQUOR produced at their works at Wandsworth during the next twelve months. The Tar and Liquor to be removed by the Contractor by barges whenever required by the Company's Engineer. Monthly cash payments to be made.

Tenders, marked "Tender for Tar," &c., to be sent to the Secretary, on or before the 29th May, inst.

The Directors do not bind themselves to accept the highest or any tender.

By order,
C. W. GRAY, Secretary.

North Street, Wandsworth, May 3, 1871.

WANTED, immediately, for Newton Gas-Works, Ayr, Four or Two second-hand PURIFIERS, with covers, &c., complete and in good condition, 8 ft. square, or 8 ft. by 5 ft., or 8 ft. by 6 ft. Not less than 2 ft. 9 in. deep, with centre-valve and connexions. State price put on trucks.

TO METER INSPECTORS.

WANTED, by the Directors of the Exeter Gas Company, a METER INSPECTOR. Applications, stating age, present employment, qualifications, and salary required, to be addressed to the undersigned, on or before Monday, the 15th inst.

RICHARD WILLIAMS, Secretary.

Gas-Works, Exeter, May 4, 1871.

TO GAS ENGINEERS.

WANTED, by the Louth Gaslight Company, a Resident ENGINEER and SUPERINTENDENT. No one need apply who cannot give recent satisfactory references as to ability, sobriety, and a thorough practical knowledge of the manufacture of gas, and the repairs of the works, mains, fittings, and meters. The party must also write a good hand, and be competent to keep accounts.

Applications to be made, post paid, to Mr. THOS. FALKNER ALLISON, Louth, Lincolnshire, the Clerk to the Company, from whom further particulars may be obtained on or before Monday, the 22nd day of May inst.

Louth, May 4, 1871.

WANTED, an appointment as Working MANAGER of a Gas-Work. Thoroughly understands the manufacture and distribution of gas, laying mains and services, fixing meters, &c. Unexceptionable references.

Address A. B., Gas-Works, Colchester, ESSEX.

WANTED, an experienced Person who thoroughly understands main and service laying, the working of engine and exhauster, and who could do all necessary repairs connected with a Gas-Work.

Address, stating qualification and references, and also the wages required, to the Gaslight Company, WREXHAM.

WANTED, an Engagement as Manager, or Secretary and Manager to a Gas Company, by a young Man who served his apprenticeship on a Corporation Gas-Work of 300,000,000 feet make, and also assisted the Engineer for over two years on a Gas-Work of 60,000,000 make. Has obtained a first-class Queen's Prize for engineering drawing. Good testimonials.

Address S. W. N., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Advertiser, a situation as FITTER, or to repair, prove, or fix gas-meters. Town or country.

Address F. H., 38, Throgmorton Street, City, E.C.

PROFITS OF GAS COMPANIES.

A Practical Gas Manager is prepared to demonstrate to Gas Companies a safe mode of DOUBLING THEIR PROFITS. Terms—A per centage upon future profits thus obtained, or paid-up shares accepted.

Address Mr. JAMES HAWLEY, Manager of the Gas-Works, Messina, SICILY.

FOREMAN Wanted at one of the largest metropolitan Gas-Works. One who thoroughly understands the whole routine of a gas establishment.

Apply by letter, stating age and present employment, addressed to G. C. T., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Bombay Gas Company, Limited, require the services of a Gentleman to proceed to Bombay as INSPECTOR. Salary £500 per annum, with progressive increase, and free passage out and home. He must be practically and fully acquainted with the various departments of construction, gas engineering and manufacture, and accounts, and be qualified to undertake any duties (indoor or outdoor) which may be allotted to him by the Manager.

Apply, by letter only, to the SECRETARY, 4, Great Winchester Street Buildings, LONDON, on or before the 14th of June next.

STATION-METER.

FOR SALE, a Station-Meter to pass 15,000 cubic ft. per hour, in a handsome square case; made in 1854.

For particulars, apply to JOHN EUNSON, Gas-Works, NORTHAMPTON.

FOR SALE, one Cockey's Patent 10-in. Centre-Valve for four purifiers; One Carter's Patent 10-in. Valve; Six ordinary 10-in Flange-Valves; Six Purifier-Lids, 8 ft. by 8 ft.; and Two Jib Cranes; the whole of which have been in use only a short time, and are nearly equal to new.

Apply to J. HEPWORTH, Gas-Works, CARLISLE.

FOR SALE, at the Kidderminster Gas-Works, a double IRON ROOF, each span 24 ft.; the length 74 ft. The above Roof is supported on a double row of cast-iron pillars, with girders in centre row. The Roof is in good condition, only erected two years ago. To be Sold owing to extensive alterations.

For further particulars apply to ANDREW DOUGALL, Manager.

TO BE SOLD CHEAP, an excellent 6-in. PIPE CONDENSER, complete, with bye-pass valves and connexions. The base is 10 ft. by 2 ft. by 18 in., and is furnished with 16 pipes, 18 ft. long.

Apply to THOMAS H. METHVEN, Gas-Works, BURY ST. EDMUNDS.

TO BE SOLD, at the Rhyl Gas-Works, North Wales, 23 15-in. Mouthpieces for Clay Retorts, ascension-pipes, hydraulic main, and delivery pipes complete. One set of 8-in. double vertical Condensers. One Station-Meter (Bent and Co.), with valves and connexions complete, to pass 4000 feet per hour. Four sets of Purifiers, respectively 6 ft. by 5 ft. 6 in., 4 ft. by 5 ft., 4 ft. by 4 ft., with connexions, &c., complete. Large lot of cast and wrought iron, comprising the interior Fittings of a 10,000 feet Gasholder; and sundry other materials.

Applications to MILES R. PARTINGTON, Secretary, Gas Company, Limited, RHYL.

BRITISH ASSOCIATION OF GAS MANAGERS.

THE ANNUAL GENERAL MEETING

Of the above Association will be held at the

"ROYAL DUBLIN SOCIETY'S" ROOMS,

KILDARE STREET, DUBLIN,

ON

TUESDAY, JUNE 13, 1871.

And following days.

Programmes and Tickets of Admission will shortly be issued.

W. H. BENNETT, Hon. Sec.,

42, PARLIAMENT STREET, WESTMINSTER, S.W.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

(INCORPORATED BY ACT OF PARLIAMENT.)

NOTICE is hereby given that the HALF-YEARLY ORDINARY MEETING of the Proprietors of the Imperial Continental Gas Association will be held at the City Terminus Hotel, Cannon Street, London, on TUESDAY, the 30th inst., at Two o'clock in the afternoon precisely, when a Report will be made to the Proprietors, a Dividend declared for the half year ended the 31st of December, 1870, and the usual ordinary business of such meeting transacted.

Notice is hereby also given that the Transfer Books of the Association, and the Register of Shareholders, will be closed on Tuesday, the 16th inst., and will remain closed until after the Half-Yearly Ordinary Meeting on the 30th inst. By order of the Board of Direction,

ALBERT F. JACKSON, Secretary.

30, Clement's Lane, Lombard Street, London, May 8, 1871.

SAN Paulo Gas Company, Limited.—The SECOND HALF YEAR'S INTEREST due to the Shareholders in this Company will be payable upon the 8th inst.

The Board have received advices from Brazil confirming the large increase in the number of public lamps, also an order for 600 private lights, which places the ultimate prosperity of the Company beyond dispute. It will be to the interest of the Company to complete these orders without delay, which will entail the desirability of having the few remaining unallotted Shares taken up.

WM. RICHARDSON, Secretary.

Pinner's Hall, Great Winchester Street, May 5, 1871.

MODERN STREET LIGHTING, by WILLIAM SUGG, A.I.C.E., price 1s. 6d., is now ready, and will be forwarded post free for 19 stamps.

W. SUGG, Vincent Works, Vincent St., WESTMINSTER, S.W.

ILLUSTRATED CATALOGUE OF THE INTERNATIONAL EXHIBITION, 1871.

THE Success that attended the Publication of their ILLUSTRATED CATALOGUE of former INTERNATIONAL EXHIBITIONS held in London, Paris, and Dublin, fully justify the proprietors of the ART-JOURNAL in announcing their intention of treating in a similar manner that which is to be opened at South Kensington on May the 1st. It is proposed to issue with the number of the Journal for that month twelve pages devoted to the illustration of the most important and beautiful works of Art manufacture, both British and Foreign, which will be contributed to the Exhibition, and to continue such publication, monthly, to the end of the year. The cost of the Journal (price 2s. 6d. monthly) will not, however, be thereby increased.

The Catalogue will be printed on toned paper, and paged separately, so as to form a distinct volume when completed. Every effort will be employed to render this illustrated report at least as attractive, interesting, and suggestively valuable as its predecessors.

Three steel engravings are given with each number of the *Art-Journal*.

LONDON: VIRTUE AND CO., CITY ROAD AND IVY LANE, And all Booksellers.

THE Bromsgrove Gas Consumers Company, Limited, have for SALE a STATION-METER complete, with bye-pass attached thereto, in good condition; will pass 30,000 feet per 24 hours. Will be at liberty in June next.

Apply to HENRY BREWSTER, Secretary of the Gas Consumers Company, BROMSGROVE.

PRIVATE TELEGRAPHS FOR GAS AND WATER WORKS.

THE Electric Telegraph Department of our business is most efficiently conducted by an experienced staff. CONTRACTS entered into for maintenance and erection of lines for Gas and Water Companies, private residences, hotels, steamships, &c. Bailey's simple A B C instrument is stronger and less liable to derangement than any other in the market.

Sole makers of L. J. Crossley's Electrical Speed Indicator.

Sole makers of Chatwood's Patent Electrical Ship's Log.

Sole makers of Bailey's dust-proof and damp-proof Signal-Bell.

Managers of Gas and Water Works are invited to ask us for our quotations, or for any information connected with Telegraphy.

JOHN BAILEY AND CO., Turret Clock Makers to the late Earl of Rosse, the British and Foreign Governments, &c., Electric Telegraph Engineers, and General Brassfounders, Albion Works, Salford, MANCHESTER.

TO GASHOLDER MAKERS.

THE Directors of the King's Lynn Gas Company are prepared to receive TENDERS for the construction of a Single-lift GASHOLDER, 70 feet in diameter, to be erected at their Gas-Works, at King's Lynn.

Drawings and specifications may be inspected obtained at the Offices of the Company, at King's Lynn; and at the Office of Messrs. Thomas and Charles Hawksley, Civil Engineers, 30, Great George Street, Westminster, S.W.; and tenders addressed to me must be delivered at the Offices of the Company, on or before Thursday, the 11th day of May, 1871.

The Company do not pledge themselves to accept the lowest or other tender.

JOHN THORLEY, Chairman.

King's Lynn, April, 1871.

ROTHERHAM GAS-WORKS.

THE Rotherham and Kimberworth Local Board of Health are prepared to receive TENDERS for the supply of a new STATION-METER, which will pass 30,000 cubic feet of gas per hour, with 12-in. connexions, and Cathels and Terrace's patent four-way gas-valve.

The Local Board also offer FOR SALE a second-hand STATION-METER complete, with bye-pass attached thereto. Will pass 10,000 feet per hour. The meter is in good condition, and is to be disposed of in consequence of extensions. By order,

Board of Health Office, W. WHITFIELD, Clerk.

Rotherham, April 14, 1871.

ALFRED LASS,

ACCOUNTANT,

28, NORTH STREET, WANDSWORTH, S.W.

Mr. Alfred Lass having had considerable experience in arranging, making up, balancing and auditing gas accounts, begs to inform the Directors of Gas Companies that he may be consulted on all matters relating thereto.

Balance-sheets prepared, Accounts audited, Consultations, Agencies, &c.

BOOKS FOR GAS ACCOUNTS.

ALFRED DOUBBLE & Co., 2, Serjeants INN, and 40, FLEET STREET, LONDON, make and supply all the various ACCOUNT-BOOKS as approved and adopted by Accountants, &c., to Gas Companies.

A complete set of the Books and Forms forwarded within a few days from receipt of order.

EDWARD SANDELL, Public Accountant and Auditor, 4, Skinner's Place, Size Lane, LONDON.

The projector of the *Original Gas Companies Analyzed Expenditure Account-Book* offers his experience and services in the examination, preparation, and production of all accounts in reference to Gas Companies. References if required.

CONSULTING GAS ENGINEERS.

MESSRS. GEORGE HEDLEY & CO., 5, GEORGE STREET, WOLVERHAMPTON,

Advise upon PARLIAMENTARY ARBITRATIONS, and all matters connected with Gas.

Plans and Specifications prepared for the Erection and Alteration of Works.

MR. ARTHUR SILVERTHORNE, formerly Assistant Engineer to the late Mr. Samuel Hughes, C.E., F.G.S., ADVISES Corporations, Companies, and others, in all matters relating to the Supply of Gas and Water.

Offices: 3, Craven Street, Charing Cross, LONDON, W.C.

ALFRED PENNY, Gas and Consulting ENGINEER,

WENLOCK IRON-WORKS,

21, WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, and T-pieces, &c., &c.

Plans, Specifications, and Estimates prepared.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 42, Parliament Street, WESTMINSTER. [Office of the JOURNAL OF GAS LIGHTING, &c.]

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, E.C., and 135, Regent Street, LONDON. Agents wanted.

ROBERT MACLAREN and CO., EGLINTON FOUNDRY, GLASGOW,

Manufacturers of all sizes of Cast-Iron Main-Pipes by an improved Patent, General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

OXIDE OF IRON.—We are prepared to supply, on moderate terms,

HYDRATED PEROXIDE OF IRON (BOG OCHRE),

Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.

FRANCIS RITCHIE & SONS,

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LAW UNION
FIRE & LIFE INSURANCE COMPANY.

CHIEF OFFICE:
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Capital—ONE MILLION STERLING,
Fully subscribed by upwards of 450 Shareholders, nearly all of whom are members of the Legal Profession.

CHAIRMAN—Sir WILLIAM FOSTER, Bart., Norwich.
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The Capital subscribed and Funds in hand amount to upwards of £1,250,000, affording unquestionable security. The Directors invite particular attention to the new form of Life Policy, which is free from all conditions.
The Company advances money on Mortgage of Life Interests and Reversions, whether absolute or contingent.

Gas-Works insured against Fire and Explosion, and Coals against Spontaneous Combustion.

Rates of Premium from 2s. to 10s. 6d.
Prospectuses, copies of the Directors' Report and Annual Balance-Sheet, and every information sent post free on application to

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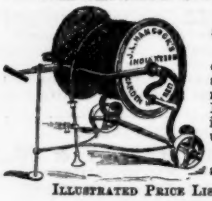
HANCOCK'S INDIA-RUBBER HOSE-PIPES,
FOR WATERING GARDENS, LAWNS, &c.



Made in 60 ft. lengths, and best make only.

Brass branches, with stop-cocks, jets, and spreaders, and union joints for connecting any size Hose. HOSE REELS (galvanized iron or painted) for winding up the Hose.

Orders promptly executed, and

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WENLOCK IRON WHARF, 20 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.
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FIRE CLAY & BRICK WORKS,
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Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
Successors to
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Illustrated Catalogues on application.

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Large Pattern-Books complete, with Book of Prices, 7s. 6d.

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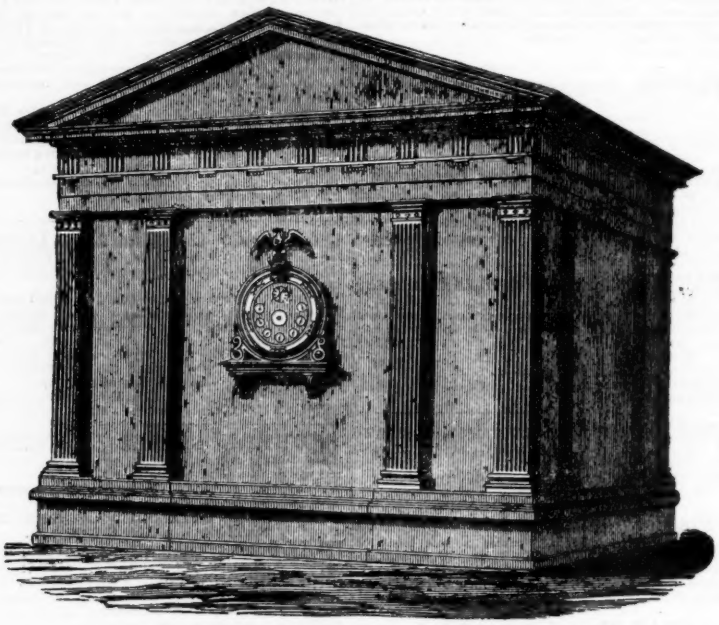
Of the best material and workmanship, carefully adjusted to the requirements of the British Sales of Gas Act and Foreign Standards of Measures.

PATENT FIXED WATER-LINE GAS-METERS,
Which are uniform with the ordinary Meters, and register with minute accuracy.

IMPROVED DRY GAS-METERS,
IN BEST TINNED IRON CASES.



GAS STATION-METERS,
WITH PLANED JOINTS.
GOVERNORS, GAUGES, INDICATORS, EXHAUST-GOVERNORS, &c.
Home and Foreign Orders promptly attended to.
All Sizes of CONSUMERS METERS, STATION-METERS, and GOVERNORS generally in Stock.
Orders almost invariably despatched on the day of receipt.
TERMS, &c., ON APPLICATION.

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PATENT PLATINUM
GASLIGHT PERFECTER.

Extract from Report by Dr. Letheby:—
"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."

Extract from Dr. Frankland's Course of Lectures at the Royal School of Mines, February, 1868.
"Scholl's Platinum Perfecter is one of the most important inventions of modern times in connexion with the burning of coal gas."

Price 1s. each for Fishtail Burners.
To be had retail of Gas-Fitters and Ironmongers.
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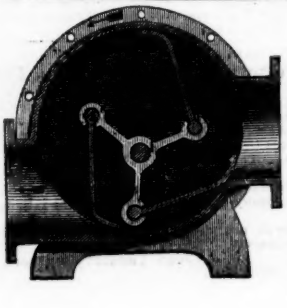
Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.
*** Further testimonials from Drs. Frankland and Crooks, showing the great practical value of this invention, will be shortly published.



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GAS EXHAUSTER.
(From 250 Feet upwards per Hour.)
Also,
ROTARY TAR AND OIL PUMPS.
For particulars and prices apply to the Patentee,
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ESTABLISHED 1827.

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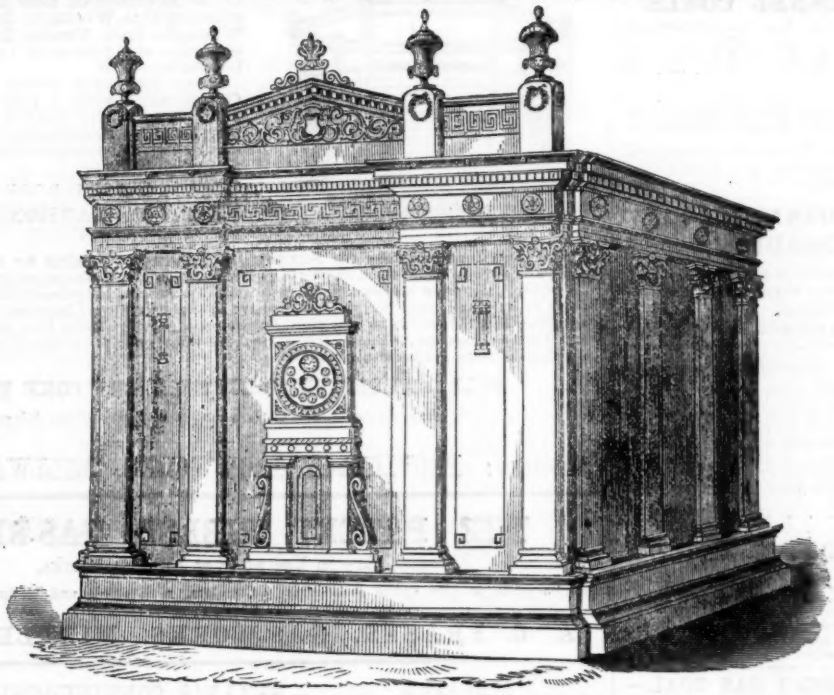
AND OF

COWAN'S PATENT SIDE-VALVE GAS-METER,

BUCCLEUCH STREET WORKS, EDINBURGH.



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W. & B. COWAN'S DRY GAS-METERS, in CAST-IRON CASES,

Possess a simplicity of construction and facility for repair greater than any yet produced, while the excellence of the material and workmanship, and accuracy of registration, cannot be surpassed. The superiority of their Dry Meters in Tin Cases is also well known, having stood the test of years.

PRICE LISTS ON APPLICATION.

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DOUBLE-FACED GAS-VALVES FOR LARGE MAINS.

These Gas-Valves for large bores are specially constructed of unusual strength and solidity. The Valve itself is a rigid wedge of cast iron, having two perfectly scraped surface facings, fitting between the two in the body, which are also surfaced. They are guaranteed absolutely tight under any chemical or other test for mains of the largest diameter, at a very moderate price.

Midland Iron-Works, Donnington, near Newport, Shropshire; 8, Finsbury Circus, London.

1862.

PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,

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CLASS II.

This Paint having been in general use over nine years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

Reference is kindly permitted by the Engineers of the City of London, Commercial, London, and Surrey Consumers Gas Companies, who pronounce it the best Paint known for their purposes.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply o all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,
CANNEL COAL MERCHANT,
HAYMARKET, EDINBURGH.
Established 1840.

SWANWICK CANNEL.

The yield of this Cannel is liberal, the illuminating power large, and coke good.

For prices and terms, apply to

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LOCHORE CANNEL COALS.

	Quantity C. Ft.	Quality Cand.	Sulphur. Per ct.	Sperm value. lbs.	Volatile matter. Per ct.	Ash Per ct.
Lochore seam	11,351	37·66	0·33	1414	52	12
or.....	12,000	34				
Waverley seam	11,000	31	0·41	1169	47	17

The valuable qualities of these Coals are the very high illuminating power, the large yield, and *great freedom from sulphur*.

Detailed analysis, &c., on application to R. B. SYMINGTON, Lochore Colliery, by DUNFERMLINE; or to ROBERT MARSHALL, 38, Commercial Street, LEITH.

INCE HALL CANNEL COAL.

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Sole Vendors of the Ince Hall Wigan Coal and Cannel.

Chief Office:
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CANNEL COAL.—The West Yorkshire Iron and Coal Company, Limited, beg to draw the attention of Gas Companies to their Cannel, of which the following is the analysis made by W. Huggon, Esq., F.C.S.:

Yield of gas per ton . . . . 10,296 cubic feet.
Illuminating power rather over 21 sperm candles.
Yield of coke per ton . . . 12 cwt.

The actual working, as reported by one of the largest gas companies in Yorkshire, gives results still more favourable, viz.—

Yield of gas . . . . . 10,416 cubic feet.
Illuminating power . . . . 21·89 sperm candles.
Coke . . . . . The same.

We add from the same source the capabilities of the common gas coal—

Yield of gas . . . . . 10,080 cubic feet.
Illuminating power . . . . 14·41 sperm candles.
Yield of coke . . . . . 13 cwt.

COLLIERIES—WEST ARDSLEY, near LEEDS.

For further particulars, address to the Office of the Company, 15, York Place, LEEDS.

POPE & PEARSON'S GAS COAL.—We have now the authority of several of the most eminent Gas Engineers of London in stating that our Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles.*

One ton yields 12¼ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

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OLD WEMYSS CANNEL COAL.—Yield of gas per ton, 12,896 cubic feet; illuminating power, 31·75 standard candles. Port of shipment, Wemyss.

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THE
HUCKNALL COLLIERY COMPANY

Can offer a CANNEL COAL yielding a large quantity of Gas of superior quality.

Prices and information on application to the HUCKNALL COLLIERY COMPANY, Hucknall Torkard Collieries, near NOTTINGHAM.

CANNEL COAL.—Coppa Colliery, Mold, Beg leave to call the attention of Gas Companies to the superior quality of their Cannel FOR GAS-MAKING PURPOSES.

This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

Ports of shipment—Birkenhead or Connah's Quay.

Waggons supplied for delivery by railway to any part of England or Wales.

For particulars, prices, and rates of freight, apply to the Coppa Colliery, Mold, FLINTSHIRE.

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WILLIAM FRASER, Inverkeithing (owner of the Works at which Fire-Clay Retorts were first made), having greatly enlarged his Works, can supply RETORTS and other FIRE-CLAY GOODS to any extent.

References can be given to managers of above a hundred Gas-Works whom he supplies.

WILLIAM FRASER ships COWDENBEATH PARROT COALS at Charlestown and Burntisland at 11s. per ton; and HALBEATH STEAM COALS, on Navy List, at 7s. per ton.

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MANUFACTURERS OF

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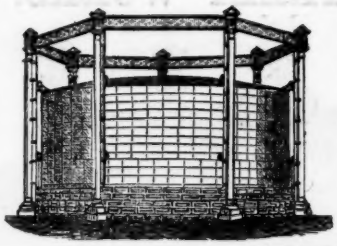

S. C. AND SONS undertake Contracts of any magnitude for the **Erection of new and Remodelling of existing Gas-Works**, for **Gasholders, Cast and Wrought Iron Tanks, Iron Roofs**, and every description of **Apparatus** for the Manufacture and Distribution of Gas.

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SOLE MAKERS OF BRETT'S PATENT COKE BARROW.

Experienced Retort Setters sent to any part of the Kingdom.

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Are in Use at over 150 Gas-Works,

And continue to give entire satisfaction. Circulars, with prices and testimonials, will be sent on application to

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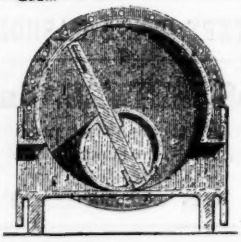
J. BEALE'S PATENT GAS EXHAUSTER.



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ARE NOW MANUFACTURED BY

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MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.

B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise.

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Special Designs prepared in perfect accordance with architectural arrangements. Estimates furnished for the Lighting and Fitting up of Theatres, Music Halls, and Public or Private Building with Gas.

GAS MOONS of the newest designs.

The Patent Gas-Regulator and Purifier reduced to 6s. 6d. per Doz.

Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1870, are now complete.

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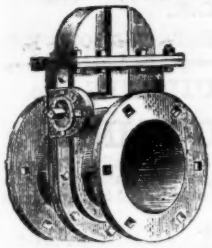
IMPROVED GAS-VALVES
WITH WROUGHT-IRON PINIONS,
From 2 inches to 18 inches, price 9s. 6d. to 12s. per inch diameter.



List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.
These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.
VALVES MADE WITH OUTSIDE RACKS TO ORDER.
ALSO,
SCREW WATER-VALVES WITH GUN-METAL FACES.
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MANUFACTURER OF
WET & DRY GAS-METERS, STATION-METERS, GOVERNORS, &c.
SOLE MANUFACTURER OF
PADDON'S PATENT STREET-LAMP REGULATORS,
For ensuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

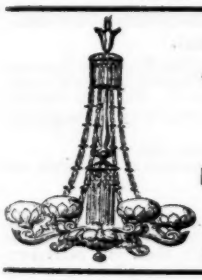

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TABLE GLASS OF ALL KINDS.
CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

GEORGE ANDERSON,
GAS AND CONSULTING ENGINEER,
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Mr. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.
PATENTEE and MANUFACTURER of the following Inventions:—
RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.
BREEZE AND TAR FUEL MACHINE.
A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.
N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.
"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

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MANUFACTURERS TO THE TRADE
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GAS-BURNERS, OPAL REFLECTORS, SMOKE CONSUMERS, &c.

ROUND AND SQUARE GAS COOKING STOVES
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GAS BROILER AND HOT PLATE
GREEN & WHITE OPAL REFLECTOR

Pattern-Books, with Prices and Discounts, sent free on application.

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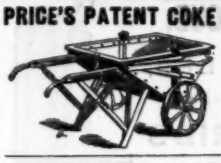

effecting a great saving of time, labour, and expense.
For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

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LIMITED,
MIDDLESBOROUGH,
SUPPLY GAS & WATER PIPES of EVERY SIZE.
Plain, Turned and Bored, and Coated.
CAST-IRON RETORTS.
Castings for Gas-Works of every description.
EXHAUSTERS.
LONDON OFFICE: 95, CANNON STREET

BIRTLEY IRON WORKS,
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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
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PATENTEES OF THE
HIGH-PRESSURE EQUILIBRIUM BALL VALVES AND DIAPHRAGM BIB & STOP VALVES,
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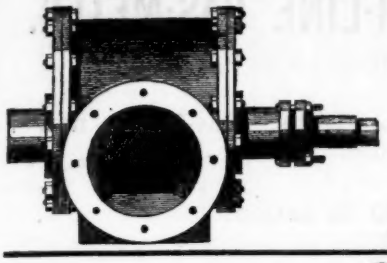

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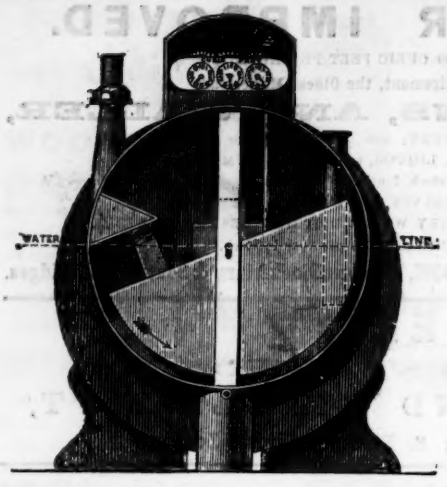

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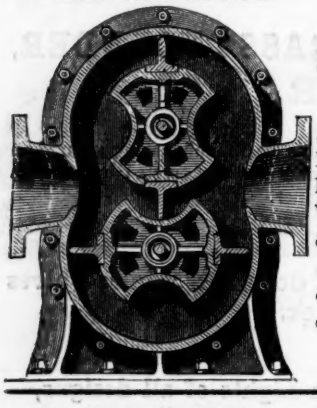

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